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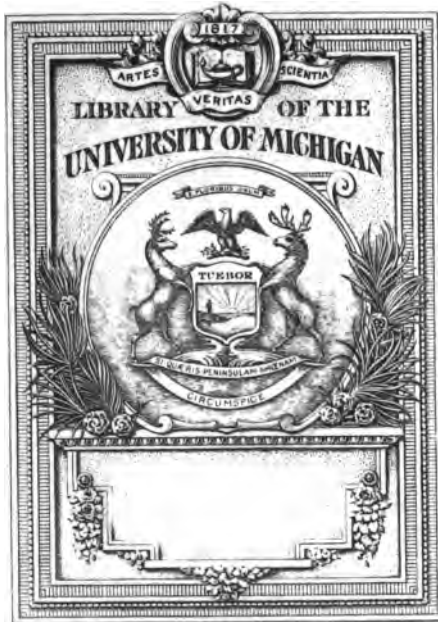
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GRADUATE COURSES

A HANDBOOK FOR GRADUATE STUDENTS

With a List of Advanced Courses announced by nineteen Colleges
or Universities of the United States for the year

1894-95

COMPILED BY A

COMMITTEE OF THE GRADUATE CLUB OF HARVARD

BOSTON:
ALFRED MUDGE & SON, PRINTERS,
No. 24 FRANKLIN STREET.
1894.

COMMITTEE ON PUBLICATION.

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W. H. SCHOFIELD.

H. E. BURTON.

J. H. BOYNTON.

E. T. BREWSTER.

C. A. DUNIWAY.

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PREFACE.

THE reception given the first edition of *Graduate Courses* was so favorable that the Harvard Graduate Club decided, with but little hesitation, to continue its publication. The committee appointed for this purpose passed at the first meeting the following resolutions affecting the scope and circulation of the new volume.

1. That the number of universities represented be increased to nineteen, to include in addition to those in the first volume, Brown, California, Leland Stanford, jr., Minnesota, Radcliffe, Vanderbilt, Western Reserve and Wisconsin.

2. That, to extend greatly the influence of the book, and to put it within the reach of all who would be helped by it, one copy be sent free to every college in the United States and Canada; and the rest sold at a nominal price, ten cents, merely to cover the price of postage and handling.

3. That, to make possible this free distribution, the Graduate Clubs, or authorities of the different universities, be asked to pledge sums of varying sizes to cover any deficit which might occur.

To these changes the different universities readily agreed, and, with more or less promptness, sent on the material for compilation. In nearly every case, also, the guarantee of financial aid was willingly given.

With the help thus afforded, the editors of this volume have aimed to present in a clear and concise form a comparative list of the courses suited for graduates in the leading colleges of the United States. In addition to this list of courses is given the academic history and publications of all instructors who were willing to reply to the circulars which were sent out. In some cases instructors have asked to have their scholastic record entirely omitted.

It is not intended that the publication should take the place of the different university circulars, which should be consulted for further and

more detailed information; but it is expected that it will afford a ready means for an interesting and useful comparison of what is being done in the same department in different universities. It is hoped that this comparison may stimulate each university to maintain the highest possible standard in all its work.

It will be noted that an index of all instructors has been added, and that the page giving the number of graduate students, the number of degrees, and the requirements for the Ph. D. degree, has been omitted, the practices of the several universities in regard to standards of admission and the like being so different that wrong inferences were thought to be inevitable.

This year the whole work of printing and editing has fallen on the shoulders of a few members of the Harvard Graduate Club, who, without any prospect of remuneration, were willing to undertake the task. If, as seems almost certain, the yearly publication of a similar volume is to be calculated upon, and if the work is in time to be the established source of information for all prospective graduate students, some more satisfactory arrangement will have to be made. By beginning work earlier, obtaining the aid of the other Graduate Clubs to a greater extent, and profiting by the experience of this year, it is hoped that mistakes will be avoided in the future.

The editors regret that there has been some delay in the appearance of the present volume. This has been largely due to the extreme tardiness of two or three universities in sending necessary information. On the whole, however, assistance has been given promptly and willingly by the Graduate Clubs or university authorities, of whose kindness and courtesy the editors desire to express their appreciation.

It may be well to say that the authorities of Harvard University have had nothing whatever to do with this publication. The Graduate Club undertook it with no other hope than that it might further the cause of graduate study in America.

For the benefit of those who shall edit this volume next year, criticisms and suggestions are invited. All communications should be addressed to C. A. Duniway, Secretary, Harvard Graduate Club.

TABLE OF CONTENTS.

	PAGE
THE GRADUATE STUDENTS' CLUBS AND ASSOCIATIONS	vii
AN ADDRESS TO THE GOVERNING BOARDS OF AMERICAN UNIVERSITIES	ix
INTRODUCTION: DESCRIPTION OF THE UNIVERSITIES	1
Brown	1
Bryn Mawr	2
California	2
Chicago	3
Clark	4
Columbia	4
Cornell	5
Harvard	6
Johns Hopkins	8
Leland Stanford, Jr.	9
Michigan	9
Minnesota	10
Pennsylvania	11
Princeton	12
Radcliffe	13
Vanderbilt	14
Western Reserve	14
Wisconsin	15
Yale	15
COURSES FOR WOMEN	16
EXPLANATION OF SIGNS AND ABBREVIATIONS	19

GRADUATE COURSES.

I. LANGUAGES AND LITERATURES.

1. Semitic, incl. Semitic History and Biblical Literature	20
2. Indo-Iranian	25
3. Classic	2

TABLE OF CONTENTS

	PAGE
4. English	36
5. Germanic	42
6. Romance	46
7. Comparative, incl. languages not otherwise classified	51
II. PHILOSOPHY, HISTORY AND THE FINE ARTS.	
8. Philosophy and Ethics	53
9. Psychology and Pedagogics	57
10. History and Politics	60
11. Government and Law	67
12. Economics	70
13. Social Science, Anthropology and Ethnology	74
14. Fine Arts and History of Art	77
15. Theory of Music	79
III. PURE SCIENCE.	
16. Mathematics	80
17. Astronomy	86
18. Physics	89
19. Chemistry	94
20. Biology, incl. Zoölogy and Botany	99
21. Geology and Geography	108
GRADUATE COURSES OF CORNELL UNIVERSITY	113

THE GRADUATE CLUBS.

There now exist Graduate Clubs at Brown, Bryn Mawr, Columbia, Cornell, Harvard, Johns Hopkins, Michigan, Pennsylvania, Radcliffe and Yale, the first being the one at Harvard, which was organized in February, 1889. Their object is "to bring together the advanced students in all lines of work, coming from all parts of the country, and educated under widely varying conditions, in such a way that they may be stimulated to a higher and broader intellectual life." They afford, moreover, a means of personal contact between the students and professors which can hardly be obtained in any other way, and which is highly appreciated on both sides. In most cases they have reception committees, whose pleasure it is to give information and advice of all kinds to students just entering the Graduate Schools, who may find themselves in need of such help. All the clubs are in hearty and cordial co-operation, and hope to be able to extend their congratulations to new clubs during the coming year. It is felt that every University doing graduate work is helped by having a Graduate Club.

The officers of these associations are as follows:

ASSOCIATION OF GRADUATE STUDENTS OF BROWN UNIVERSITY.

Executive Committee.

Pres., J. F. GREENE, Brown.
Sec., EMMA E. BROWN, Smith.
Treas., A. N. LEONARD, Brown.
Cor. Sec., I. L. FOSTER, Brown.
W. H. EDDY, Brown.
Mrs. L. P. BATES, Boston Univ.

Committee on Membership and Hospitality.

A. C. CROWELL, Brown. EMMA E. BROWN, Smith.
J. L. ALGER, Brown.

BRYN MAWR GRADUATE CLUB.

Pres., JANE L. BROWNELL. *Sec.*, DOROTHY W. LYON.
V. Pres., THERÈSE F. COLIN. *Treas.*, WINIFRED WARREN.

Executive Committee.

THERÈSE F. COLIN, *Chairman*. FLORENCE V. KEYS.
JANE L. BROWNELL. EMMA H. PARKER.
SUSAN G. WALKER.

THE GRADUATE CLUBS.**CORNELL GRADUATE STUDENTS' CLUB.**

Pres., L. K. MALVERN.

V. Pres., E. M. MILLS.

Sec., F. C. FABEL.

THE GRADUATE CLUB OF HARVARD UNIVERSITY.

Pres., W. HENRY SCHOFIELD, Victoria Univ., Toronto.

V. Pres., H. E. BURTON, Harvard.

Sec., C. A. DUNIWAY, Cornell.

Treas., H. B. SHAW, Univ. of North Carolina.

Executive Committee.

H. E. BURTON, *Chairman*; F. C. BABBITT, J. H. BOYNTON, E. T. BREWSTER, C. A. DUNIWAY, F. L. DUNLAP, F. P. GULLIVER, H. R. MEYER, E. PIERCE, G. B. ROGERS, F. H. SAFFORD, W. H. SCHOFIELD, H. B. SHAW.

THE GRADUATE CLUB OF JOHNS HOPKINS UNIVERSITY.

Hon. Pres., PROF. IRA REMSEN.

Pres., A. W. STRATTON, Toronto.

V. Pres., J. H. LABANE, Johns Hopkins.

Sec., J. F. NORRIS, Johns Hopkins.

Treas., W. H. MALTBY, Ohio Wesleyan.

THE GRADUATE CLUB OF THE UNIVERSITY OF MICHIGAN.

Executive Committee.

Pres., JOHN B. JOHNSTON.

V. Pres., ELLEN C. HOGEBOOM.

Sec. and Treas., MELVIN P. PORTER.

ANNAH M. SOULE.

DELOS F. WILCOX.

THE GRADUATE CLUB OF THE UNIVERSITY OF PENNSYLVANIA.

Pres. ex-officio, Acting Provost, CHARLES C. HARRISON.

First V. Pres., JOSIAH H. PENNIMAN.

Second V. Pres., LEO S. ROWE.

Sec. and Treas., J. P. GARBER.

THE GRADUATE CLUB OF RADCLIFFE COLLEGE.

Pres., LUCY A. PATON.

Sec., MRS. FLORA W. PATTERSON.

Treas., HENRIETTA GARDINER.

ADDRESS
TO THE
Governing Boards of American Universities,
BY GRADUATE STUDENTS.

AT a meeting of affiliated clubs of graduate students, held in New York City, April 23, 1893, at which representatives of the Cornell, Harvard and Johns Hopkins organizations were present, it was resolved to issue an address to the governing boards of American Universities touching certain interests of graduate students.

We wish, then, at this time, to refer to two needs : first, uniformity in the requirements for the Doctor's degree ; and, second, the facilitation of university intermigrations.

The Doctor's degree ought to stand all the world over, as it does in Europe, for research ; and among our higher universities there is a practical uniformity in this requirement. Many universities, however, confer the degree after merely an examination on reading pursued *in absentia*, or on studies pursued in residence. Many institutions, moreover (31 in the Report of the Commissioner of Education for 1888-89,) give honorary Ph. D. degrees. Such practices make foreigners suspicious of the significance of our higher degrees.

We ask that the Doctor's degree be given only to persons competent to advance knowledge in some department, and trained as resident graduates in some university of high rank.

While seeing the advantages of pursuing the sequence of elementary studies planned in any one university, we must recognize the importance to higher education of such frequent migrations on the part of the student as occur in German universities. The scope of the courses at one university is limited by the knowledge and special interests of the instructors there. By receiving instruction from several teachers

at different places, the student gains that breadth of view which is his best preparation for research. On the other hand, the teachers gain new ideas and new inspirations from contact with students trained elsewhere. Intermigration is leaven, penetrating and raising the whole lump of higher study. In the absence of intermigrations each university is forced to try to cover the ground completely, and instead of an effective division of labor the announcements of many departments show a dreary uniformity, and an absence of special, advanced courses, for which the instructors have no time.

We do not forget the compensating advantages of long residence at one centre of study and research. It is a question how far a conservative regard for these should control university legislation. But, in view of the importance of student migration, to students and instructors alike, we believe it ought to be encouraged. While we are not ready to ask outright that the required time of residence at any particular university be reduced to one year, we should welcome the discussion of this and similar changes. Most of the more advanced universities do, indeed, confer degrees upon properly qualified students who have spent the last year in residence with them; but there are several important exceptions, such, *e. g.*, as Bryn Mawr, Harvard and Yale.

With the advance of graduate work, we look for a development of the spirit of co-operation between American universities. Meanwhile, to the accomplishment of the reforms suggested above we purpose to devote our best energies.

[Approved by the Committees on the Handbook appointed by the affiliated Graduate Clubs.]

INTRODUCTION.

BROWN UNIVERSITY.

By charter March 2, 1764, the General Assembly of the English Colony of Rhode Island and Providence Plantations incorporated a body of Trustees and Fellows for a college or university in that colony. It was enacted that the number of the Trustees be thirty-six, and that the Fellows, inclusive of the president, who must always be a Fellow, be twelve.

In the spring of 1764, Rev. James Manning opened a Latin School at Warren, Rhode Island, preparatory to the work of college instruction. In September, 1765, he was formally appointed by the corporation President of the College and Professor of Languages and other branches of learning. The first Commencement was held at Warren, September, 1769. This was the beginning of Rhode Island College.

In the spring of 1770 the College was moved to Providence. At its meeting on Sept. 6, 1804, in view of distinguished beneficence to it on the part of Mr. Nicholas Brown, the Corporation voted, "That in all future time the College be known by the name of Brown University. In its Academic Department, Brown University matriculates for the degrees of Bachelor of Arts, Bachelor of Philosophy, Bachelor of Science, Civil Engineer and Mechanical Engineer.

The University also offers excellent facilities for graduate study, to which its own graduates and those of other colleges are alike welcome. Not only are the libraries, the laboratories of the University, its Seminaries, its Observatory, and its various museums, all of a nature greatly to assist advanced study, but the industries of the city of Providence offer numerous and rare opportunities for special investigations.

An "Association of Graduate Students" holds monthly meetings during the year, at which papers are read and addresses made on topics connected with graduate work. The "Philosophical Club," the

"Biological Club" and the "Seminaries" of several different departments likewise have frequent meetings.

So far as concerns its Graduate Department, the University places women students on exactly the same footing as men.

The year is divided into three terms, beginning the third Wednesday in September. Commencement is on the third Wednesday in June.

Faculty, 66 ; Resident Graduates, 30 ; Non-Resident Graduates, 67 ; Undergraduates, 490 ; Women's College, 73. President, E. BENJAMIN ANDREWS ; Registrar and Secretary of Faculty, FREDERICK T. GUILD.

BRYN MAWR COLLEGE.

Founded in 1880 with the endowment of Dr. Joseph W. Taylor of New Jersey, who proposed to establish an institution of learning for the "advanced education" of women. A President and a Dean of the Faculty were elected in the spring of 1884, a careful study of the domestic organization of other women's colleges was made, and the system of major and minor electives in fixed combination was adopted from Johns Hopkins. The College opened in the fall of 1885 with fifty-four students. Three classes of students are admitted : graduate students, undergraduate students, and hearers. The hearers are not recognized by the College, attend courses on the consent of the instructor, and receive certificates of study from him only. Graduate students must have a diploma from a college of good standing, may pursue the graduate courses offered, and are entitled to personal guidance from their instructors. Two travelling fellowships are awarded annually, nine resident fellowships, and five graduate scholarships. The year is divided into semesters, beginning Oct. 2, 1894, and Feb. 11, 1895. Resident Graduates, 44 ; Undergraduates, 197 ; Professors and Associates, 22 ; Readers, Instructors, Demonstrators, 5. President, M. CAREY THOMAS ; Secretary, MADELINE VAUGHAN ABBOTT, Bryn Mawr, Pa.

UNIVERSITY OF CALIFORNIA.

The University of California comprises the colleges of Letters, Agriculture, Mechanics, Mining, Civil Engineering, and Chemistry. It is controlled by a Board of 23 Regents.

Advanced instruction, leading to the degrees of Master of Arts (with the corresponding degrees in Letters and Science) and Doctor of Philosophy, is offered by the University of California to graduates of any reputable college or university.

The University library contains more than 55,000 volumes, and is admirably adapted, so far as its extent allows, for purposes of advanced study and research. The laboratories are extensive and well equipped, and every facility is afforded for work in the higher lines of Pure and Applied Science. No charge is made for instruction or the use of the library, and there are five graduate scholarships. The annual income of the University exceeds \$200,000. There are about 100 instructors and 700 students of both sexes. President, MARTIN KELLOGG, Berkeley, Cal.

UNIVERSITY OF CHICAGO.

After the old University of Chicago, founded in 1857, had, in 1886, dissolved, Mr. John D. Rockefeller in connection with the American Baptist Education Society took steps, in 1888, towards founding a new University, inasmuch as he offered \$600,000 for such a purpose, provided \$400,000 more should be raised. This condition being soon fulfilled, and land worth \$125,000 having been given by Mr. Marshall Field, of Chicago, a charter was granted to six petitioners, and in 1890 a Board of Trustees with 21 members was chosen. This body consists of three classes, whose terms of office expire in successive years, their successors being elected by the Board itself. Two thirds of the Trustees and the President of the University shall forever be members of Baptist churches, but no religious test shall be applied to other persons connected with the University. The Trustees may make any by-laws for the control of the University, and the care of its funds; they appoint the President and instructors. The University Council, which consists of the chief administrative officials of the University, directs administrative matters; the University Senate, composed chiefly of the heads of departments of instruction, directs educational matters. The assets of the University, including funds subscribed and those now in hand, exceed \$7,000,000. The University proper includes the Graduate School and the Divinity School.

Admission to the former is granted to graduates of high-grade colleges and to special students under certain conditions. Applications (accompanied by testimonials) are to be addressed to the University Examiner. The year is divided into quarters, beginning on the 1st of July, October, January, and April. Resident Graduates, 305 ; Divinity Students, 180 ; Collegiate Students, 491. Faculty of Arts, Sciences, and Literature : Professors, 87 ; Instructors and Tutors, 31 ; Readers, 5 ; Assistants, 16 ; Docents, 10, and Lecturers, 7. Total of teachers, 154. President, W. R. HARPER ; University Examiner, F. F. ABBOTT, Chicago, Ill.

CLARK UNIVERSITY.

Founded in 1887, through the munificence of a citizen of Worcester, with the aim of promoting independent investigation quite as much as instruction. The management of the University is in the hands of a self-perpetuating corporation of nine members, who appoint officers of the University, fix their compensation and their tenure of office. The University, which opened in October, 1889, with the five departments of Mathematics, Physics, Chemistry, Biology, and Psychology, is devoted to pure rather than to applied science. It admits only graduate students upon satisfactory testimonials. Students, 32 ; Fellows, 21 ; Professors, 5 ; Instructors and Lecturers, 3. President, G. STANLEY HALL, Worcester, Mass.

COLUMBIA COLLEGE.

Founded in 1754, in New York City, by a charter from George II., King of England. Originally called "Kings College," its name became changed to "Columbia College" after the Declaration of Independence and the confirmation of its charter by the State of New York. Reorganized in 1890 after the pattern of the German Universities, with the five University Faculties (in addition to the School of Arts) of the School of Law, College of Physicians and Surgeons, School of Mines, School of Political Science, and School of Philosophy, to which has recently been added the School of Pure Science. Columbia College is an autonomous corporation, with large private funds, managed by a Board of Trustees consisting of

twenty-four members. This Board chooses the President and Professors for life on good behavior. The oversight of the plan of instruction and the lectures, the maintenance of discipline, the awarding of degrees and honors, devolves upon the President, the University Council (consisting of the Deans and one other representative from each Faculty, elected by all members of the Faculty), and the Faculties. The property of Columbia College has the estimated value of \$13,000,000; its expenditure in 1891-92 was \$629,000. The Faculty of Philosophy has charge of the University courses of instruction and research in philosophy, philology, and letters; with these may be combined certain courses in the Faculties of Law, Political Science, and Pure Science. Students are received either as candidates for degrees, or to pursue special or partial courses. Matriculates must have completed the curriculum of some good college to at least the close of the junior year. Candidates for the degree of Ph. D. from the Faculties of Political Science, Philosophy and Pure Science are required to read at sight Latin, French and German. The courses in the School of Political Science are open to any person who matriculates, but candidates for a degree must have the qualifications of matriculates of the Faculty of Philosophy. First term begins Oct. 1, 1894; second term begins Feb. 11, 1895. President, SETH LOW; Secretary of the University Council, Prof. J. K. REES, New York City.

CORNELL UNIVERSITY.

An Act of Congress in 1862, entitled "the Morrill Land Grant Act," granted to each State 30,000 acres for each Senator and Representative in Congress, on condition that the funds derived from their sale should be devoted to colleges which should aim (without excluding scientific and classical studies) for the higher education of the industrial classes. Cornell University was incorporated by the New York Legislature in 1865, to obtain the 990,000 acres falling to that State, and with the additional endowment by Ezra Cornell of \$500,000 and 200 acres, with useful buildings. It was opened in 1868, its charter providing for the broadest instruction, unsectarianism, economy to students, and the free tuition of one student from each assembly district of the State. Since 1872,

women students have been admitted. The University is an autonomous corporation, administered by a Board of 23 Trustees, of which the oldest descendant of Ezra Cornell, the President of the University, and several State officers, *ex officio*, are members, while of the fifteen others, two are annually elected by the Trustees and one by the Alumni. The President and professors are chosen by the Trustees. Its chief funds have been derived from the sale of the land granted, and from several munificent gifts. Its funds now amount to \$9,000,000. In addition to advanced degrees, the University confers baccalaureate degrees in Arts, Philosophy, Letters, Science (including Bachelor of Science in Agriculture), Architecture, Civil Engineering, Mechanical and Electrical Engineering, and Law. The year is divided into three terms, beginning Sept. 27, 1894, Jan. 3, 1895, and April 2, 1895, respectively. Number of Fellows, 22; Graduate candidates for advanced degrees, 230; Graduates, not candidates for such degrees, 10; Undergraduates, 1,364; School of Law, 19 Professors, 70; Instructors, 48; Assistants, 27; Lecturers (in Law) 7; Total of teachers, 152. President, J. G. SCHURMAN; Registrar and Secretary of the Faculty, Prof. G. P. BRISTOL, Ithaca, N. Y.

HARVARD UNIVERSITY.

Harvard College, the oldest of the higher institutions of learning in America, was founded in 1636 by the General Court of Massachusetts Bay voting to give £400. Twelve of the most eminent men of the colony were charged with its organization, "for the training of learned and God-fearing clergy," at "Newetowne," later changed to Cambridge in recognition of the English University, where many of the colonists had been educated. In 1638 a young clergyman of Charlestown, John Harvard, a graduate of Cambridge, England, and a former student of Emanuel College, at that University, bequeathed to the College £800 and his library, whereupon it took his name. In 1640, by a legislative enactment, certain officials and clergy of the colony, together with the President of the College, were intrusted, as overseers, with its entire administration. Since, however, the body proved itself too large, the General Court, in 1650, made the College a corporation, consisting of the President, five Fellows, and a Treasurer, with the right of filling it

STANFORD UNIVERSITY.

of Stanford and Jane L. Stanford.
 1891. The general manage-
 ment is vested in a self-perpetuating
 body for life, of whom fifteen consti-
 tute the founders during their
 lives exercise all the powers and
 are the "Trustees." To the Presi-
 dent, Faculty and the determination of
 the course. Each professor, however, is
 independent, and in the details of his
 instruction. The general scope of the
 university is "that of a university with
 the best of the highest grade, in-
 cluding galleries of art, laboratories
 and facilities necessary for the study of
 natural and physical training, and for the
 instruction and enlargement of the
 mind, beginning Sept. 6, 1894,
 Faculty, 84; Undergraduates
 10; Assistants, 10.
 Registrar, O. L. ELLIOTT,

ILLINOIS.

as a part of the public
 in a Board of Regents,
 with the consent of the Senate,
 The Regents enacted
 salaries, and regulated
 the *ex officio* president of
 should consist of the
 of law; and of
 in 1841; that of

Number of Resident Graduates, 248; Non-Resident, 11; Undergraduates, 1,936; other departments, 1,220. Professors, 118; Instructors, 110; Demonstrators and Assistants, 79; Lecturers, 15; total of teachers, 322. President, C. W. ELIOT; Assistant Secretary, RICHARD COBB, Cambridge, Mass.

JOHNS HOPKINS UNIVERSITY.

Founded through the munificence of a citizen of Baltimore, Johns Hopkins, who gave over \$3,000,000 to establish the University, and an equal amount for a hospital. The University became established under the laws of Maryland by the charter of 1867; in 1870 the Trustees met and elected their President and Secretary. The President of the University was chosen in 1874. Lectures were first delivered in 1876. The Trustees are the ultimate source of authority in all matters pertaining to the University. The President of the University is *ex officio* a member of the Board, and mediates between it and the Faculty. The Academic Council of the Faculty guides the various departments of study, and selects the Fellows. President, Faculty, and Academic Council are appointed by the Board of Trustees.

"The Board of University Studies" arranges the courses for graduates, and the examinations of the candidates for the doctorate. The expenditure of the University in 1890-91 was \$170,000. The University provides "collegiate" and "university" instruction. University instruction is offered to advanced and graduate students, whether candidates for a degree or not. They are admitted to courses after consulting with the instructor. The proximity to Washington affords access to unusually large libraries and museums. Number of Graduate Students (taking courses leading to the degree of Ph. D.), 261; Undergraduates and specials, over 200. Professors and Associates, 56; Instructors, 13; Lecturers, 14. President, D. C. GILMAN; Secretary of Board of University Studies, G. H. EMMOTT; Registrar, T. R. BALL, Baltimore, Md.

LELAND STANFORD, JR., UNIVERSITY.

Founded in 1885 by the Hon. Leland Stanford and Jane L. Stanford. Was first opened to students in October, 1891. The general management and control of the University is vested in a self-perpetuating board of twenty-four Trustees chosen for life, of whom fifteen constitute a quorum. The charter provides that the founders during their lives "shall perform all the duties and exercise all the powers and privileges enjoined upon and vested in the Trustees." To the President is intrusted the selection of the Faculty and the determination of the educational policy of the University. Each professor, however, is regarded as supreme in his own department, and in the details of his work is responsible only to the President. The general scope of the institution is defined in the Charter to be "that of a university with such seminaries of learning as shall make it of the highest grade, including mechanical institutes, museums, galleries of art, laboratories and conservatories, together with all things necessary for the study of agriculture in all its branches and for mechanical training, and for the studies and exercises directed to the cultivation and enlargement of the mind." The year is divided into semesters, beginning Sept. 6, 1894, and Jan. 7, 1895. Number of Graduate Students, 84; Undergraduates and specials, 891; Professors, 55; Instructors, 10; Assistants, 10. President, DAVID S. JORDAN; Secretary and Registrar, O. L. ELLIOTT, Stanford University, California.

UNIVERSITY OF MICHIGAN.

Founded in 1837, by an Act of Legislature, as a part of the public instruction. Its government was at first vested in a Board of Regents, appointed by the Governor of the State, with the consent of the Senate, several State officers being *ex officio* members. The Regents enacted laws, appointed and removed professors, fixed salaries, and regulated courses of instruction. The Governor was made *ex officio* president of the Board. It was enacted that the University should consist of the three departments, of literature, science, and the arts; of law; and of medicine. The first of these departments opened in 1841; that of

medicine in 1850; that of law in 1859. In 1852, by amendment of the State Constitution, the regents became elected by the people, and they elected a President to be the principal executive officer of the University, the Board retaining a general supervision and a control of all expenditures. At present there are eight Regents, two of whom are elected biannually, holding office for eight years. In addition to the three departments mentioned above, the University consists of the School of Pharmacy and of the Homœopathic and the Dental Colleges. The professors of all the Faculties constitute the University Senate, which considers all questions of general interest. The income of the University is derived chiefly from a fund created by sale of lands granted by the United States, from a State tax, and from students' fees. The expenditures in 1892-93 were \$375,986.08.

The Graduate School was established in 1892 and in connection with the Faculty of Literature, Science, and the Arts. It is under the special government of the "Academic Council," consisting at present of all the heads of the departments. It is open to graduates of high-class colleges who wish to become candidates for a higher degree, and also for those who do not. Applications (with credentials) are to be made to the President. Students pursue three lines of study—one major and two minor. The year is divided into semesters, of which the first begins Oct. 1, 1894; the second, Feb. 18, 1894.

In 1893-94, Resident Graduates in Academical Faculty, 85; Non-resident, 32; Undergraduates, 1310; other departments, 1251. Professors and Assistant Professors, 74; Lecturers and Instructors, 39; Demonstrators and Assistants, 42. President, J. B. ANGELL; Registrar, Prof. P. R. de PONT.

UNIVERSITY OF MINNESOTA.

The University of Minnesota was originally organized by an Act of the Territorial Legislature of 1851, and was adopted by the people of the State in 1857, as the "State University." It was reorganized in 1864, 1868, and 1872. Its actual beginning was in 1868; in September of that year instruction in the college classes was offered for the first time.

The University is organized into colleges and departments as follows:

A graduate department; colleges of (1) Science, Literature and the Arts; (2) Engineering, Metallurgy and the Mechanic Arts; (3) Agriculture; (4) Law, and a Department of Medicine which is organized into colleges of (1) Medicine and Surgery; (2) Homœopathic Medicine and Surgery; (3) Dentistry; (4) Pharmacy. The graduate work of this institution consists largely in independent individual investigation under the direction of the professors in charge of the departments. Consultation may be once a week or oftener, as the case may demand. Men and women are admitted to all colleges and departments on the same terms. Annual income, ca. \$210,000. Professors and Instructors, 139; whole number of Students in 1893-94, 1828; Graduate Students, 91. President, CYRUS NORTHROP, LL. D.

UNIVERSITY OF PENNSYLVANIA.

A pamphlet, called: *Proposals Relative to the Education of Youth in Pennsylvania*, written in 1749 by Dr. FRANKLIN, led to an association by certain citizens of Philadelphia, for the purpose of raising to the dignity of an Academy the Charitable School which had been established in 1740, and which was then struggling under a debt upon the building erected for its use and the accommodation of the celebrated preacher Whitefield. So successful was the undertaking that in two years the trustees applied to the proprietors for a charter, which was given. Under this charter the right to confer Academic degrees was granted, and the institution was named "*The College and Academy of Philadelphia.*" In 1779 an alleged attempt to restrict the freedom of opinion required in the charter gave the State Legislature a pretext on which they confiscated the properties of the *College*, and bestowed them upon a new organization, called in its charter the "Trustees of the University of the State of Pennsylvania." Ten years later, these rights and properties were all restored, and in 1791 an act was passed amalgamating the old *College* in the new University, with the agreement that "the name of the institution be '*The University of Pennsylvania,*' and that it be stationed in the city of Philadelphia."

The University of Pennsylvania now comprises the following departments: THE COLLEGE, in which are given the arts and science courses, and courses in science and technology, finance and economy, American

history, biology, music, architecture, chemistry, chemical engineering, mechanical and electrical engineering, and civil engineering, the Dept. of Medicine, the Univ. Hospital, the Dept. of Law, the Auxiliary Dept. of Medicine, the Dept. of Dentistry, the Dept. of Philosophy, the Dept. of Veterinary Medicine, the Dept. of Physical Education, the Museum of Archæology and Paleontology, the Laboratory of Hygiene, the Grad. Dept. for Women, the Wistar Institute of Anatomy and Biology.

The University of Pennsylvania is governed by a Board of twenty-four trustees and the Provost. The Governor of the State is *ex officio* President of the Board. There are in attendance on the various courses of the University 2,180 students, distributed as follows: the College, 683; Dept. of Philosophy, 154; Dept. of Law, 228; Post-graduate Course in Law, 8; Dept. of Medicine, 796; Auxiliary Dept. of Medicine 39; Dept. of Dentistry, 231; Dept. of Veterinary Medicine, 78; Dept. of Hygiene, 6. The various courses in all departments are given by a teaching force of 268.

The Dept. of Philosophy is in all its courses entirely distinct from the undergraduate work, but in such subjects as are not usually represented at all in undergraduate work, both advanced and elementary courses are offered. Undergraduate courses are open to any graduate students that may wish to take them.

Acting Provost of the University, CHARLES C. HARRISON; Dean of the Dept. of Phil., Prof. WILLIAM A. LAMBERTON, University of Pennsylvania, Phila., Pa.

PRINCETON.

(College of New Jersey.)

Founded in 1746, through the influence of Dr. Dickinson and others, by a charter from the Governor, John Hamilton. In 1748 a second and more ample charter was granted by Governor Belcher, and this, after the Revolution, was confirmed and renewed by the State Legislature. The corporation is a Board of Trustees, who hold and administer the property of the College, make laws for its government, choose its President and Faculty, and confer degrees. This Board is self-perpetuating, composed of twenty-seven members, with the Gov-

ernor of the State as President *ex officio*. The John C. Green School of Science was established in 1873, and offers courses in Natural Sciences and Technology, some of which are intended for graduates. In connection with the John C. Green School of Science is the School of Electrical Engineering, which is designed to furnish instruction in the theory of electricity, as well as in the application of electricity in the arts. Every instructor in the College may, with the leave of the Faculty, give instruction to graduates. "He shall meet with his class for at least one hour a week, and not more than three hours a week during the Academic year." The year is divided into two terms of eighteen weeks each, beginning Sept. 19, 1894, and Feb. 7, 1895, respectively. Number of Resident Graduate Students (including Fellows), 123; Non-Residents, 8; Undergraduates, 961. Professors, 43; Instructors and Assistants, 33. President, F. L. PATTON; Registrar, H. N. VAN DYKE, Princeton, N. J.

RADCLIFFE COLLEGE.

Radcliffe College, the successor of the Society for the Collegiate Instruction of Women, offers systematic collegiate instruction to women under the professors and other teachers of Harvard University. More than seventy instructors of the University are teachers in Radcliffe College.

Fay House contains the recitation rooms and offices, and a select working library. The College has four laboratories, of Physics, Chemistry, Botany, and Biology. The collections of the Agassiz Museum of Comparative Zoölogy, the Peabody Museum of American Archæology, the University Museums of Geology, Botany, and Mineralogy, and the Semitic Museum, are also open to the students; and, by vote of the President and Fellows of Harvard College, the students have the use of the University Library, containing 400,000 volumes. Opportunities for study in the Astronomical Observatory, the Botanic Garden, and the Herbarium are also afforded.

The requirements for admission are identical with those for admission to Harvard College. The courses of instruction given in Radcliffe College correspond to both "undergraduate" and "graduate" courses offered by Harvard University, and are more than sufficient to enable

a woman to perform the work required by the University for the degrees of A. B. and A. M. In addition to these, graduate students in Radcliffe College have access to a large number of graduate courses in Harvard University. The examinations are the same in both institutions, and the diplomas conferring the degrees of A. B. and A. M. are countersigned by the President of Harvard University as a guarantee that these degrees are equivalent to the corresponding degrees given by the University.

VANDERBILT UNIVERSITY.

Vanderbilt University owes its foundation to the munificence of Cornelius Vanderbilt, of New York, who on the 27th of March, 1873, made a donation of \$500,000. This was subsequently increased until the entire donation amounted to \$1,000,000. Mr. Wm. H. Vanderbilt, the son of the founder, made donations at various time aggregating \$450,000. Mr. Cornelius Vanderbilt, the grandson of the founder, made a donation of \$30,000 in January, 1888. The university is organized in seven distinct departments, as follows: Academic, Biblical, Law, Medical, Pharmaceutical, Dental, Engineering. Each department has its faculty of instruction charged with its special management. The Board of Trust is self-perpetuating and consists of thirty-one members. The bishops of the M. E. Church, South, and the chancellor of the University are *ex officio* members of the Board. The other members are elected for a term of eight years. The attendance for the year 1893-4 was as follows: Academic, graduate, 29; Academic, undergraduate, 174; Biblical, 62; Engineering, 54; Law, 30; Medical, 243; Dental, 128; Pharmaceutical, 23. Teachers of all grades, 66. Chancellor, James H. Kirkland; Secretary of the Faculty, Wils Williams, Nashville, Tenn.

WESTERN RESERVE UNIVERSITY.

Founded 1826 at Hudson, Ohio, as Western Reserve College. In 1882 this College was removed to Cleveland, Ohio, and named Adelbert College of Western Reserve University in honor of the son of its benefactor, Mr. Amasa Stone, who gave it \$600,000. Other departments were gradually added, so that the University now consists of Adelbert

College, the College for Women (opened 1888), the Graduate School (established 1892), the Medical College (founded 1843, became part of the University 1883), the Franklin T. Backus Law School (opened 1892), the Dental School (established 1892). The corporation is a self-perpetuating board of twenty-nine trustees, who hold the property of the University and administer its affairs. In 1893-94 this property was valued at \$1,100,000. The total number of professors and instructors was 69; of students, 395.

The Graduate School was established in 1892 and is open to graduates of high-grade colleges without distinction of sex, and with or without reference to the attainment of higher degrees. Applications (with credentials) should be made to the Dean of the Graduate Faculty. Candidates for higher degrees pursue three lines of study, one major and two minors. The year is divided into two terms, of which the first begins Sept. 20, 1894, the second Feb. 11, 1895. The Faculty of the non-professional Graduate School numbers 26. President, CHAS. F. THWING; Dean of Graduate School, R. W. DEERING.

WISCONSIN.

Founded in 1849, and controlled by a Board of Regents appointed by the Governor of the State.

The University consists of the College of Letters and Science, the College of Mechanics and Engineering, the College of Law, the College of Agriculture, the School of Pharmacy. Attendance: Resident Graduates, 53; Non-Resident Graduates, 39; Undergraduates in the College of Letters and Science, 702; other departments, 585. Professors, 47; Assistant Professors, 13; Instructors, 25. The year is divided into three terms, the next year beginning Sept. 12, 1894. President, CHARLES KENDALL ADAMS; Registrar, W. G. HIESTAND.

YALE UNIVERSITY.

Founded in 1701, through the influence of ten clergymen, by a charter from the General Court of Connecticut, which created a Board of Trustees, all of whom were to be clergyman. The court endowed this College of Connecticut with an annual grant, and the State continued

up to the present century to appropriate funds for its support. Located temporarily at Saybrook, it was permanently established at New Haven in 1716, and named after Elihu Yale, who had donated £400. The University is an autonomous corporation, under the control of a Board of Trustees, composed of ten Congregational clergymen of the State of Connecticut, the Governor and Lieutenant-Governor of the State, *ex officio*, six alumni (chosen by vote of all the alumni) and the President, who is *ex officio* President of each Faculty. The University comprises (1) the Department of Philosophy and the Arts, including the courses for Graduate Instruction, Yale College, Sheffield Scientific School (began in 1847) and the Art School; (2) Divinity School; (3) Medical School; (4) Law School. The University funds, exclusive of grounds, buildings, and collections, amounted, in 1893, to \$1,181,650.53; the Academic fund to \$1,468,890.40; those of the Theological Department to \$578,465.35; of the Sheffield Scientific School, \$255,778.09; of the Medical Department to \$35,131.93; of the Law Department to \$76,686; of the Art School to \$92,305.57; and the Loomis fund, \$312,415.51. Expenditure for 1892-3, \$650,560.10. Graduates of colleges, of both sexes, are received with or without reference to the attainment of a higher degree. The year is divided into two terms, beginning Sept. 27, 1894, and Jan. 8, 1895, respectively. Number of students in Graduate courses, 143; Undergraduates, 1,687; other departments, 426. Professors, 93; Instructors, 48; Assistants and Demonstrators, 40; Lecturers, 19. President, Rev. TIMOTHY DWIGHT; Dean of the Graduate Department, Prof. ARTHUR T. HADLEY, New Haven, Conn.

COURSES FOR WOMEN.

In addition to those colleges represented in this book which are exclusively for women, viz., Bryn Mawr and Radcliffe, graduate courses are open to women in Brown, University of Pennsylvania, Western Reserve, and Yale; and all courses, graduate and undergraduate, in Chicago, Cornell, Michigan and Minnesota. The University of Pennsylvania offers four fellowships to women, entitling the holders to free tuition and residence in the dormitory for women. Students at Barnard College are admitted to courses at Columbia.

INSTITUTION.	FEES.	FELLOWSHIPS AND SCHOLARSHIPS.		SIZE OF LIBRARY.	
		NUMBER.	ANN. VALUE.	BOOKS.	PAMPH.
Brown	\$150 + { \$25 Ph. D. \$15 A. M.	1	\$500	80,000	20,000
Bryn Mawr . . .	\$100 + Lab. fees.	2 Travelling Fell. 9 Res. Fell. 5 Schol.	\$500 \$525 \$200	22,300	—
California	No fees.	5	—	55,000	—
Chicago	\$35 per quarter, \$5 incidentals.	55 Fell. 30 Schol. and Fell.	\$300 \$120	240,000 (est.)	—
Clark	—	10 Fell. 10 Fell. 10 Schol. 10 Schol.	\$600 \$400 \$200 \$100	16,000	2,000
Columbia	\$150, or \$15 per ann. for each hour per week. \$35, Grad. fee.	24 Fell. 1 Fell. in <i>Physics</i> . Several free or re- duced tuitions.	{ \$500 and no tuition fees.	160,000	—
Cornell	\$100-\$125 \$10, Grad. fee.	22 Fell. 16 Schol.	\$500-\$600 \$300	150,000	25,000
Harvard	\$150 + Lab. fees, or \$45 per course.	17 gen. { Fell. 5 spec. } 28 Schol. 20 Schol.	\$750-\$500 \$300-\$200 \$150	422,000	400,000 (est.)
Johns Hopkins . .	\$150; \$5, Registration fee; \$10, Grad. fee.	20 Fell. 20 Schol. 30 Schol. for res. of Va. and N.C. only.	\$500 \$200 \$225-\$150	60,000	40,000
Leland Stanford, Jr.	Lab. fees.	0	—	19,000	5,000

INSTITUTION.	FRES.	FELLOWSHIPS AND SCHOLARSHIPS.		SIZE OF LIBRARY.	
		NUMBER.	ANN. VALUE.	BOOKS.	PAMPH.
Michigan	\$25, Matric. fee, non-res. of State. \$10, Matric. fee, res. of State. \$35, Ann. fee, non-res. of State. \$25, Ann. fee, res. of State.	1 Fell. in <i>Classics</i> .	\$500	86,000	16,000
Minnesota	\$10 + Lab. fees.	1	\$250	35,000	—
Pennsylvania	\$150.	1 Fell. in <i>Physics</i> . 5 Fell. in <i>Economics</i> . (3) English. 4 (Women.)	\$600 Free tuition. Tuition and residence.	150,000	100,000
Princeton	\$40, Matric. fee. \$25, Ann. fee. \$50, Grad. fee.	11 spec. Fell.	\$600-\$200	171,000	25,000
Radcliffe	\$200 + Lab. fees.	2 Schol.	\$200	Use of Harvard Library.	
Vanderbilt	\$100 + Lab. fees.	10 Fell.	\$200	—	—
Western Reserve	\$75 + Lab. fees.	Several free or reduced tuitions.	—	26,000	12,000
Wisconsin	—	—	—	—	—
Yale	\$100.	5 Fell. 20 Schol.	\$400 \$100	200,000	100,000

EXPLANATION OF LISTS OF GRADUATE COURSES.

In the notes, following *Lib. contains*, or otherwise, are frequently given special collections of books. These were gathered from the Bibliographical Contributions of the Harvard University Library, No. 45, 1892. In some cases, by special request, such notes have been omitted.

Special funds open to students of the department are also given.

From some of the Universities, information on the above two points was not obtained.

Following the instructor's name are usually (1) his highest degree and present position; (2) previous positions held and journals edited; and (3) subjects upon which he has published. These items are separated by dashes. One or more may be omitted.

Following the brief title of the course are given the number of hours per week and number of weeks of appointment with instructor. Unless the months are given, the course usually extends from October to May (inclusive).

- L. Number of hours laboratory work.
- * Course open also to undergraduates.
- lab. Laboratory work (indefinite).
- fort. Fortnightly.

Bracketed courses (Harv.) are not given this year. In almost every case they will be given next year.

The names of the months have been abbreviated as follows: Ja., F., Mr., A., My., Ju., Jul., Au., S., O., N., D.

The Cornell courses of the first ten sections will be found on page 113. The editors regret exceedingly that, through no fault of the University authorities, this material arrived too late for insertion otherwise.

* * * COURSES IN RADCLIFFE COLLEGE ARE IDENTICAL WITH HARVARD COURSES.

I. LANGUAGE AND LITERATURE.

1. SEMITIC LANGUAGES AND LITERATURES.

[Including Semitic History and Biblical Literature.]

BROWN.

J. R. JEWETT,

Ph. D., Strasburg, 1890; Assoc. Prof. Sem. Lang. and Lit.; A. B., Harvard, '84; Syria, Egypt '84-'87; Berlin, Strasburg, '88-'90; Instr. Semitic Lang., Harvard, '87-88—Arabic proverbs.

- *Hebrew. 3, 34.
- *Hebr. Syntax. 3, 12. S.-D.
- *Isaiah. 3, 34.
- *Aramaic. 3, 22. Ja.-Ju.
- *Arabic. 3, 34.
- *Assyrian. 3, 34.
- *Oriental History. 3, 34.

BRYN MAWR.

Semitic Library of A. Amiand, of Paris.

GEORGE A. BARTON,

Ph. D., Harvard, 1891; Assoc. in Bibl. Lit. and Semit. Lang. — Harvard, '89-91.

- Hebrew. 2, 30.
- Aramaic, incl. Syriac and Bibl. Aramaic. 2, 30.
- [Assyrian. 2, 30.]
- [Patristic Greek, esp. sub-apostolic lit. 2, 30.]
- *Hist. of Israel. 2, 30.
- *Hist. and progress of relig. ideas in Israel, and N. T. relig. ideas. 2, 30.
- Cuneiform inscript. and O. T. 1, 30.
- *Hist. Spanish and Bagdad Califates. 1, 30.
- Seminary, fort.
- [Advanced Bibl. Lit. 2, 30.]

CALIFORNIA.

J. VOORSANGER,

D.D.; Prof. Semit. Lang. and Lit.

- Elements of Hebrew. 4.
- More advanced courses will be added in succeeding years.

CHICAGO.

W. R. HARPER,

Ph.D., Yale, 1875; President of Univ.; Head Prof. Semitic Langs. and Lits.—Prof. Hebrew and Cognate Langs., Baptist Union Theol. Sem., '79-86; Principal Chautauqua System since '91; Prof. Semitic, Yale, '86-91; Woolsey Prof. Biblical Lit., Yale, '89-91; Ed.: *Old and New Test. Student and Hebraica*.

- Early O. T. Traditions. 4, 12, Ja.-Mr.
- O. T. Wisdom Literature. 4, 12, O.-D.
- Semitic Seminar. 4, 12, O.-D.
- Hebrew Lang. 10, 6, Au.-S. (with C. E. Crandall).
- Arabic geog., hist., and commentary. 4, 12, Ja.-Mr.
- Phœnician. 5, 6, Ja.-F.
- Samaritan. 4, 6, Ja.-F.
- Adv. Hebr. gram. 5, 6, Au.-S.
- Comp. Semitic gram. (adv.). 5, 6, F.-Mr.
- Beginning Hebrew (with C. E. Crandall). 10, 6, A.-My.
- Books of Samuel (with C. E. Crandall). 10, 6, My.-Ju.
- O. T. Institutions and Laws. 4, 12, A.-Ju.
- The Book of Job. 4, 6, Au.-S.
- Arabic lang. 4, 6, Au.-S.
- Earlier Suras of Kuran. 4, 12, O.-D.

E. G. HIRSCH,

Ph.D., Leipzig, '76; Prof. Rabbinical Lit. and Philos.—U. of Penn.; Leipzig, '76; Minister, '77-81; Ed.: *Zeitschrift*, '80-87, and *Reformer*, '86.

- Gen. Introduction to Rab. Literature. 4, 6, O.-N.
- Talmud. 4, 6, Ja.-F.
- Talmud (adv.). 4, 12, Ja.-Mr.
- Jerusalem Talmud. 4, 12, A.-Ju.

- Syriac Authors. 4, 12, A.-Ju.
 One thousand and one nights. 4, 12, A.-Ju.
 Advanced Ethiopic. 4, 6.
 Targ'um. 4, 6, A.-My.
 Mishna. 4, 6, N.-D.
 Coptic. 4, 6.
- SYLVESTER BURNHAM.
 Advanced Hebrew Grammar. 4, 6, Jul.-Au.
 The Psalter. 4, 6, Jul.-Au.
- E. D. BURTON,
 A.B.; Prof. New Testament Lit. and Exegesis.—Rochester Theol. Sem., 1879-82; Leipzig, '87; Instr. N. T. Greek, Rochester Theol. Sem., '82-3; Assoc. Prof., Newton Theol. Inst., '83-6; Prof. N. T. Interpret., *ibid.*, '86-92; Asst. Ed. *Biblical World*.—Moods and tenses in N. T. Greek; study of N. T. works; life of Jesus.
 Life of Paul and Introduction to the Epistles. 4, 12, O.-D.
 New Test. Greek. 4, 12, Ja.-Mr.
 Romans. 4, 12, Ja.-Mr.
 Intro. to Synoptic Gospel. 4, 12, Ja.-Mr.
- I. M. PRICE,
 Ph.D., Leipzig, 1887; Assoc. Prof. Semit. Langs. and Lits.—Bapt. Union Theol. Sem., B.D., '82; Leipzig; Prof. in Hebrew and Cognate Langs., Baptist Union Theol. Sem., '88-92; Assoc. Ed.; *Biblical World* and *Hebraica*.—O. T. hist. inscriptions.
 Special Intro. to Prophetic Books. 4, 12, O.-D.
 Bi-lingual Babyl. psalm lit. 2, 12, O.-D. (sem.)
 Hebrew Lexicography (sem.). 2, 12, Ja.-Mr.
 Special Intro. to Hebrew Poetry and Poetical Books. 4, 6, Ja.-F.
 Messianic Prophecy. 4, 12, Ja.-Mr.
 Biblical Aramaic. 5, 6, F.-Mr.
 The Psalter. 4, 12, A.-Ju.
 Heb. lang. 10, 6, Ju.-Jul.
 History, Principles and Methods of O. T. Interpretation (sem.). 2, 12, A.-Ju.
 Deuteronomy. 4, 6, Ju.-Jul.
- G. S. GOODSPEED [see also 10],
 Ph.D., Yale, 1891; Assoc. Prof. Comp. Relig. and Anc. Hist.—Yale; Freiburg, '91-2; Asst. in Semitic, Yale, '88-91.
- Beginnings of Hebrew History. 4, 12, O.-D.
 Hist. of Persian Empire. 4, 12, O.-D.
 Earliest Historical Religions. 4, 12, O.-D.
 Hist. of Hebrew Monarchy. 4, 12, A.-Ju.
 Hist. of Ancient Egypt. 4, 6, A.-My.
 Hist. Babylon and Assyr. 4, 6, My.-Ju.
 Hist. of Hebrew Religion. 4, 12, A.-Ju.
 Exilic and Post-Exilic. Hist. 4, 12, Jul.-S.
- R. F. HARPER,
 Ph.D., Leipzig, 1886; Assoc. Prof. Semitic Langs. and Lits.—Instr. in Semitic, Yale, '87-8, '89-91; Assyriologist, Expedit. Babylon. Explor. Fund (U. of Penn.), '88-9.
 Assyrian lang. 5, 12, Jul.-S.
 Assyrian lang. 5, 12, O.-D.
 Later Hist. Inscriptions. 4, 12, O.-D.
 Palestinian Life. 4, 6, A.-My.
 Palestinian Geog. 4, 6, A.-My.
 Assyrian Letters. 4, 12, A.-Ju.
 Micah. 4, 6, Jul.-Au.
 Early Assyr. hist. inscrip. 5, 12, Jul.-S.
 Beginning Syriac. 5, 12, O.-D.
- C. E. CRANDALL,
 Ph.D., Yale, 1891; Univ. Exten. Instr. Semitic Langs.—Bapt. Union Theol. Sem., B.D., '85; Assist. Semitic, Yale, '89-91.
 Deuteronomy, Sight Reading. 2, 6, Ja.-F.
 Jeremiah, Sight Reading. 2, 6, F.-Mr.
 Hist. Hebrew. 5, 6, Au.-S.
- W. MUSS-ARNOLT,
 Ph.D.; Instructor in Biblical and Patristic Greek, and Assistant Recorder.—University of Tübingen, 1878-80; D.B. Theological Seminary of the Reformed Dutch Church, New Brunswick, N. J., 1882; Instructor in Hebrew, *ibidem*, 1882-3; Fellow and Fellow by Courtesy, Johns Hopkins University, 1883-88; Ph.D., *ibidem*, 1888; Professor of Ancient Languages, New

Chicago—Continued.

Windsor College, Md., 1888-90; Instructor in New Testament Greek, Johns Hopkins University, 1891-3; Acting Assistant Professor of Semitic Languages and Hellenistic Greek, University of Michigan, 1893.—Semitic and Indo-European Etymology; Assyrian Lexicography.

Josephus. O.-D.

Septuagint. 4, 12, Ja.-Mr.

Textual Criticism of N. T. 4, 12, Ja.-Mr.

Christian Lit. to Eusebius. 4, 12, A.-Ju.

Intro. to general Epistles and Revelation. 4, 12, A.-Ju.

N. T. Syntax. 4, 6, Au.-S.

Paul's Epistles to Thessal. 4, 6, Au.-S.

N. T. Quotations from O.-T. Part II. The Epistles. 4, 6, Jul.-Au.

C. F. KENT.

Apocryphal wisdom lit. 4, 12, Ja.-Mr.

Outline of Hebrew Hist. 4, 12, O.-D.

Books of Kings. 4, 6, O.-N.

Isaiah, I.-XXXIX. 4, 6, N.-D.

C. W. VOTAW,

B.D., Yale, 1891; A.M., Amherst, '92.—Docent in Biblical Lit., Yale, '88-91; Chicago, '92-3; Instr. N. T. Greek, Am. Inst. Sac. Lit., '91-2.—Founding of Christian Church.

Rapid Interpretation of N. T. 4, 12, A.-Ju.

SHAILER MATHEWS,

A.M.; Associate Professor of New Testament History and Interpretation; A.B., Colby University, 1884; A.M., *ibid.*, 1887.—Newton Theological Institution, 1884-7; Associate Professor of Rhetoric, Colby University, 1887-9; Lecturer in New Testament Department, Newton Theological Institution, 1889-90; University of Berlin, 1890-1; Professor of History and Political Economy, Colby University, 1889-94.

Hist. of N. T. times. 4, 12, O.-D.

Luke. 4, 12, O.-D.

Life of Christ. 4, 12, O.-D.

The Epistle to Galatians. 4, 6, Au.-S.

COLUMBIA.

Various courses at the Union Theological Seminary are open to students, namely, in N. T. Greek, 8 courses, 1-2 h., by Prof. Vincent; in Semitic, 17 courses, 1-2 h., by Profs. F. Brown, Briggs, and Mr. Fagnani; in Church Hist., 5 courses, 2 h., by Mr. W. A. Brown.

RICHARD J. H. GOTTHEIL,

Ph.D.; Prof. Rabbin. Lit. and Semit. Lang.

*Bibl. Heb. (el.) 2, 30.

*" (adv.) 2, 30.

Bibl. Heb. (3d course.) 2, 30.

*Rabbin. Heb., Med. Heb. poetry. 1, 30.

*Rabbin. Heb., Psalms. 1, 30.

Semitic epigraphy (adv.) 1, 30.

Assyrian (adv.) 2, 30.

Arabic (2d course.) 2, 30.

" (3d course.) 2, O.-Ja.

*Syriac. 2, O.-Ja.

Seminary: Egyptian dialect of mod. Arabic. 1, 30.

HARVARD.

Semitic conference meets twice monthly. Special Semitic Library, gift of L. H. Schiff. Semitic museum contains large collection of monuments, tablets, seals, coins, and photographs, providing means of original research.

CRAWFORD H. TOY,

A.M., Virginia, 1856; Hancock Professor of Hebrew and other Oriental Languages.—Berlin, '66-68.—Prof. So. Baptist Theolog. Sem., '69-79; Prof. Harvard, '80-pr.—Semitic Grammar, Religion of O. T., Quotations from O. T. in N. T.

(Absent on leave, 1894-95.)

[Hist. of the Bagdad Califate.—Egypt under the Moslems.—The Crusades from Mohammedan sources. 1, 31.]

[Ethiopic. 1, 31.]

[Hist. of the Spanish Califate.—The Korān.]

[Kitāb al-Aḡāni.]

[General Semitic Grammar.]

DAVID G. LYON,

Ph.D., Leipzig, 1882; Hollis Professor of Divinity.—Leipzig, '79-82.—Prof. Harvard, '82-pr.—Record. Sec., Am. Oriental Soc., '86-pr.—Assyrian Lang. and Relig., Hebrew Hist.

Hebrew (adv.) 2, 31.

*Babylonian-Assyr. hist. 1, 31.

- *History of Israel. 2, 31.
- Classical Aramaic. 2, 16, O.-Ja.
- Jewish Aramaic. 2, 15, F.-My.
- Assyrian (adv.). 2, 31.
- Assyrian grammar (research).

CHARLES H. MOORE,

A.M. Asst. Prof. of Design in the Fine Arts. Harvard, '91. — Instr. in Drawing and Principles of Design, '73-'91. — Development and character of Gothic Architecture.

- *Hist. of prechristian Heb. lit. 2, 31.
- *Hist. Heb. relig., compared with other Semitic relig. 2, 31.
- Arabic (adv.). 2, 31.
- With Mr. Chester.

F. D. CHESTER.

Ph.D., Harvard. Asst. in Sem. Lang. — Harv., '92-'94. — Contributions to Proc. and Journal of Am. Oriental Soc. Specialty, Arabic.

- *Hebrew (el.). 3, 31.
- Arabic. 2-3, 31.
- [Phoenician. — Schröder's Phönizische Sprache. — Corpus Inscriptionum Semiticarum.]
- Assyrian (el.). 2, 31.

JOHNS HOPKINS.

Announcements of further courses.

PAUL HAUPT,

Ph.D. Leipzig, 1878; Prof. of the Semitic Languages. — Leipzig, '76-'79; Berlin, '79-'80. — Privatdoc. at Göttingen, '80, and Prof. of Assyriology in the same, '83; Hon. curator of coll. Oriental Antiq. in U. S. Nat. Mus.; Co-editor of *Contributions to Assyriology and Comp. Semitic Philology* and of *Assyriological Library*. — Oriental History and Archaeology, Comp. Semitic philol., O. T. Exegesis, biblical criticism, Assyrian grammar, cuneiform texts.

- Prophets of O. T. 1, 15, O.-Ja.
- Hist. Books of O. T. 1, 15, F.-My.
- Hebrew (el.). 1, 30.
- Crit. interpret. book of Eccles. 1, 30.
- Prose Comp. in Heb. Arabic. Assyrian. 1, 30.
- Assyrian Seminary. 2, 30.
- Ethiopic (el.). 1, 30.

C. JOHNSTON,

A.M., Virginia, 1879, M.D., U. of Med., '80; Assoc. in Semitic Langs.

- Reading Heb. at sight. 1, 30.
- Assyrian (el.). 2, 30.
- Arabic (el.). 1, 30.
- Extracts from Arabic Geog. 1, 15, O.-Ja.
- Select Suras. of Koran. 1, 15, F.-My.
- Syriac (el.). 1, 30.

MICHIGAN.

J. A. CRAIG,

Ph.D., Leipzig, 1886; Yale, '80-'83; Leipzig, '83-'86. Instr. and Adj. Prof. of Bib. Lang. Acting Prof. of Sem. Lang., Oberlin, '91; Berlin and London, '92 and '93.

- *[Gospel of John and Luke; I. Corinthians. 2, 17, O.-F.]
- *Galatians; Old Test.; Apocrypha. 2, 17, F.-Ju.
- *Hebrew. — Hist. Books. 3, 34.
- *Psalms and Prophets. 2, 34.
- *Assyrian. — Selections from Hist. Inscriptions. 2, 34.
- *Assyrian. — Sargon, Assurbanipal, the Deluge Descent — Ishtar. Selected Psalms. 2, 34.
- *Hist. of Babylonia and Assyria. 2, 17, O.-F.
- *Hist. of the Jews. 2, 17, F.-Ju.
- *Arabic. — Koran and Murug-al-dahabi — Masudi. 2, 17, O.-F.

PENNSYLVANIA.

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H. V. HILPRECHT,

Ph.D., Erlangen, 1885; Prof. of Assyrian and Curator of Babylonian Museum. — Leipzig and Erlangen, '80-5. — Prof. Classic Lang. in "Fridericianum," Davos, Switzerland, '84-5; Repetent Theol. Fac., Erlangen, '85-6; Prof. O. T. Lang. and Theol. Sem., Mt. Airy, Philadelphia; Ed. foll. *S.S. Times and Lutheran Church Rev.* '86. — "Freibrief Nebukadnezar's I," "Die Annalen Sanheribs," "Babylon," Babylonian inscriptions, Paul Géhhardt, various theolog. and Assyriolog. papers.

Ethiopic:

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MORRIS JASTROW, JR.,

Ph.D. Leipzig, 1884; Prof. Semitic Languages; Breslau, '81-4; Berlin, '84; Paris, '84-5; Strasburg, '85; also Asst. Librarian, Univ. of Penn. — Grammat. works of Abu, Zakarija Chajjig; Babylonian, Phœnician and Assyrian langs.

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A.M.; Instr. in Hebrew. — Princeton Theol. Sem., '79-83. — Asst. in O. T. Dept., Princeton Theol. Sem.

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J. H. STEVENSON,

B.A., B.D., McGill Univ., Adjunct Prof. of Hebrew in Biblical Dept.

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TIMOTHY DWIGHT,

A.M., D.D., Yale, '86, LL.D., Harvard, '86, LL.D., Princeton, '88. President — Memb. Amer. Com. Revision of N. T.: Ed. *New Englander*. — Biblical Exegesis, Biography. Yale College.

- The Book of Revelation. 1, 32.
 *The Pauline Epistles (Engl.). 1, 32.
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E. L. CURTIS,

Ph.D., Hanover Coll., 1886; Holmes Prof. Heb. Lang. and Lit. — Formerly Prof. O. T. Lit. and Exegesis, McCormick Theol. Sem. — O. T. lit., esp. prophecy.

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FRANK K. SANDERS,

Ph.D., Yale, '89; Asst. Prof. Biblical Lit. and Instr. in Semit. Lang.—Yale, '86-9.—Vice-Prin. Am. Inst. Sacred Lit., '91 foll.—Postexilic Hist., O. T. Wisdom Lit.

HARLAN CRULMAN,

B.D., Yale, '89; Ph.D., Yale, '94; Asst. in Sem. Lang.
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- Assyro-Babylonian Hist. and Lit. 2, 20, Ja.-Ju.
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- *Sight Read. in Heb. 2, 32.
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- *Bib. Prob. (Eng.). 2, 32.
- *Messianic Prophecy. 1, 32.

2. INDO-IRANIAN LANGUAGES AND LITERATURES.

[See also 7.]

BROWN.

ALONZO WILLIAMS [see 5].

Sanskrit. 2, 34.

ADRIAN SCOTT [see 5].

(With Prof. Williams.)

BRYN MAWR.

EDWARD W. HOPKINS,

Ph.D., Leipzig, 1881; Prof. of Greek, Sanskrit, and Comparative Philology.—Leipzig, '78-81; Berlin, '80; Sorbonne, Collège de France, '81.—Asst. in Latin and Instr. in Zend, Columbia, '81-4.

- *Beginners' Sanskrit. 1, 30.
- Introduct. to Zend and Zend-Avesta.

CHICAGO.

CARL D. BUCK [see also 7],

Ph.D., Yale, 1889; Asso. Prof. Sanskrit and Comp. Philology.—Yale, '86-7; Am. School at Athens, '87-9; Leipzig, '89-92.—Phonological Notes, esp. on Greek, Latin, Sanskrit, and Avestan.

- Sanskrit (el.). 4, 36, O.-Ju.
- Sanskrit (el.). 8, 12, Jul.-S.
- Old Persian. 4, 12, A.-Ju.

COLUMBIA.

EDWARD D. PERRY,

Ph.D., Tübingen, 1879; Prof. of Sanskrit.—Leipzig, '76-8; Tübingen, '78-9.—Tutor in Greek and Instr. in Sanskrit, Columbia, '80-91.—Indra in the Rig Veda, Sanskrit Primer.

- *Sanskrit (el.), [with Prof. Jackson]. 2, 30.
- Sanskrit (adv.), [with Prof. Jackson]. Boehtlingk's Chrestomathie, Introduct. to Veda. 2, 30.
- Pali (el.). 1, 30.
- *Avestan (el.), [with Prof. Jackson]. 2, 30.
- *Phonetics. 1, 30. [Omitted in '94—95.]

A. V. WILLIAMS JACKSON,

Ph.D., Columbia, 1886; Adj. Prof. of English Lang. and Lit., and Instr. in the Iranian Lang.—Columbia, '83-6; Halle, '87-9.—Lecturer on Mazdaean Religion at Harvard, '92.—A Hymn of Zoroaster, Yasna 31; Avestan Alphabet and its Transcriptions; An Avestan Grammar in comparison with Sanskrit.

- Avestan (adv.). 2, 30.
- *Old Persian inscriptions. 1, 15, O.-Ja.
- *Pahlavi. 1, F.-My.

Columbia—Continued.

Zoroaster. 1, 30.

Comparative Iranian Grammar. 1, 15,
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HARVARD.*Besides numerous works on the literature and antiquities of India, the Univ. possesses nearly 1000 manuscripts of Sanskrit and Prakrit texts,—the largest collection in America.*

CHARLES R. LANMAN [see also 7],

Ph.D., Yale, 1873; Prof. of Sanskrit.—Yale, '71-3; Berlin, '73-4; Tübingen, '74-5; Leipzig, '75-6.—Sec. Am. Philolog. Ass., '79-84; ed. its Transactions, Vols. X.-XIV.; Pres. of same, '89-90; Cor. Sec. Am. Oriental Soc., '84-pr.; Fellow and Assoc. at Johns Hopkins, '75-80.—Noun Inflection in Veda; Sanskrit Reader, with vocab. and notes; various papers on Oriental philosophy and customs; edits Harvard Oriental Series.

*Sanskrit (adv.). 3, 15, O.-Ja.

Introduction to the Vedas. 3, 16,
F.-My.

[Adv. course in Buddhist lit. 3, 31.]

Course for beginners in Pāli. 3, 31.

Research in Sanskrit, use of manuscripts.

Cursory Sanskrit reading. 2, 15,
F.-My.

P. E. MORE,

A.M., Asst. in Indo-Iranian Lang.

*Sanskrit (el.). 3, 31.

JOHNS HOPKINS.*Announcements of further courses.*

MAURICE BLOOMFIELD [see also 7],

Ph.D., Johns Hopkins, 1879; Prof. of Sanskrit and Comp. Philology.—Yale, '77-8; Johns Hopkins, '78-9; Berlin and Leipzig, '79-81.—Fellow at Johns Hopkins, '78-9; Associate, '81-3; Assoc. Prof., '83-91.—Director Am. Oriental Soc.—Ed. from MSS.: The Kāucika-sūtra of the Atharva-Veda, and the Grhyasānigraha; Interpretation of the Veda, Buddhism, Greek, and Indo-European Grammar.

Vedic Seminary: Lit. of Brāhmanas and Upanisads in relation to hymns of Vedas. 1, 30.

Lang. and lit. of Zend-Avesta. 1, 30.

Readings in Hitopadeśa and Mann.
2, 15, O.-Ja.The Çakuntāla, with introduc. to
Prakrit. 1, 15, F.-My.El. of Vedic philol. 1, 15, F.-My.
Sanskrit; gram. comp. (el.). 2, 30.**LELAND STANFORD, JR.**

W. MILLER [see 3].

*Sanskrit (el.). 2, 32.

MICHIGAN.

JAMES A. CRAIG [see 1].

*Sanskrit—Lanman's Sanskrit Reader.

MINNESOTA.

J. S. CLARK,

Univ. of Minnesota, '76; Instr. in Latin and Math., '76-80; Asst. Prof. of Latin, '80-83; in Germany and Italy, '83-86; Prof. of Latin since '86.

Sanskrit, Grammar and Reader;
Story of Nala. 4, 30.**PENNSYLVANIA.***The Pott Library, 4000 volumes, especially rich in Sanskrit and the Romance and Teutonic languages.*

MORTON W. EASTON,

Ph.D., Yale; Prof. of English and Comp. Phil.—Eng. Language. Philological subjects.

Sanskrit gram. and readings. 2, 30.
Çakuntāla and the Veda. 2, 30.

Old Iranian gram.; Avesta. 2, 30.

Old Persian text of Behistūn inscription.
1, 30.**PRINCETON.**

S. R. WINANS [see also 3].

Ph.D., Prof. of Greek and Instr. in Sanskrit.

*Sanskrit gram., reading. 2, 32.

?Sanskrit and comp. gram.

VANDERBILT.

H. C. TOLMAN,

Ph.D., Yale, 1890; Prof. of Greek and Acting Prof. of Sanskrit.

Sanskrit Grammar and Reading. 3, 32.

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SAMUEL BALL PLATNER,

Ph.D., Yale, 1885; Prof. of Latin and Instructor in Sanskrit. — Yale, '79-85; Instructor in Latin and French, Adelbert College, '85-90; Berlin. — Rome, '89-90; Asst. Prof. of Latin, Adelbert College, '90-

92; Prof. of Latin, '92. — Latin Grammar, Rom. Archaeology, Silver Latin.

*Sanskrit. 3, S.-Ju.

YALE.

Sanskrit. 4, 32.

3. CLASSIC LANGUAGES AND LITERATURES.

[For Biblical and Patristic Greek, see 1, Semitic Languages and Literatures.]

BROWN.

J. IRVING MANATT,

Ph.D., Yale, 1873; LL. D., Iowa, 1887; Prof. of Greek Lit. and Hist. Prof. Denison Univ., '74-76; Leipzig, '77-78; Prof. of Greek, Marietta Coll., '78-84; Chancellor, Univ. of Nebraska, '84-89; Athens, '89-93. Ed. Xen. Hellenica; Contrib. to Old and New Test. Student, Andover Rev., Atlantic Mo.

The Attic Orators. 3, 34.
Plato, Republic; Aristotle, Politics and Politeia. 2, 34.
Attic Inscriptions. 1, 10, Ap.-Ju.
Contemp. Greek Lit.

Prose of Augustan Age. Devel. of Historical Writing. 3, 12, Ja.-Mr.
Prose of Silver Age. 3, 10, Ap.-Ju.

BRYN MAWR.

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HERBERT WEIR SMYTH,

Ph.D., Göttingen, 1884; Prof. of Greek. — Leipzig, '79-81; Göttingen, '81-3. — Instr. in Classics, Williams, '83-5; Lecturer in Greek, Johns Hopkins, '85-7; and Reader in Greek Lit. in same, '87-8. — Greek Grammar and Greek dialects.

[Attic tragedy, Æschylus, Aristotle's poetics, lectures. 4, 30.]
Attic orators. 4, 30.
[*Æschylus, Ag. and Eumen. 2, 15 F.-My.]

BARKER NEWHALL,

Ph.D., Johns Hopkins, 1891; Instr. in Greek. Fellow Johns Hopkins, '90; Berlin, '91; Athens, '91-92. Plato and Socrates.

Epic and Lyric Poetry. 3, 34.
The Attic Drama. 3, 34.

E. W. HOPKINS [see 2].

[*Demosthenes. 2, 15, O.-Ja.]
[*Lyric Poets and Theocritus. 1, 15, O.-Ja.]
[*Sophocles, CEd. Tyr. 1, 15, F.-My.]
Sophocles. 2, 15, O.-Ja.
Lyric Poets and Theocritus. 1, 15, O.-Ja.
Æschylus, Prometheus. 1, 15, F.-My.

A. G. HARKNESS,

A.M., Brown, 1882; Prof. of Roman Lit. and Hist. Berlin, Bonn, '81-83; Instr. Classics, Peddie Inst., '79-81; Prof. Lat. and Germ., Colgate Univ., '83-89; Assoc. Prof. Lat., Brown, '89-93.

Origin of Lat. Poetry and Devel. of Drama. 3, 12, S.-D.
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Poetry of Silver Age. 3, 10, Ap.-Ju.

W. G. EVERETT,

A.M., Brown, 1888; Assoc. Prof. of Philosophy. Instr. Greek, Brown, '89-90; Instr. Latin, '90-94. In charge of Latin Department, '94-95.

Prose of Republic. Devel. of Orat. 3, 12, S.-D.

G. A. BARTON [see 1].

[*New Test. Greek. 2, 30.]

Bryn Mawr — Continued.**GONZALEZ LODGE,**

Ph.D., Johns Hopkins, 1886; Assoc. Prof. of Latin.— Johns Hopkins, '83-6, Bonn, '89.— Prof. of Greek, Davidson Coll., '86-8; Am. School of Class. Studies, Athens, '88-9.

[Seminary. Roman Epistolography. 3, 30.]

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*Lat. Prose Comp. 1, 30.

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M.A., Trinity College, Cambridge; Lect. in Greek and Lat. Lit.
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Ph.D., Yale; Prof. Greek Lang. and Lit.
Greek Seminary.
Republic of Plato.

I. FLAGG,

Ph.D., Göttingen; Assoc. Prof. Class. Phil.
Sophocles, Plays and Fragments.

G. M. RICHARDSON,

Ph.D., Leipzig; Assoc. Prof. Class. Arch.
Greek and Roman Bucolic Poetry.
Roman Satire.

CHICAGO.**WILLIAM G. HALE,**

A.B.; Head Prof. of Latin.— Leipzig, Göttingen, '76-7; Tutor of Latin, Harvard, '74-6, '77-80; Prof. of Latin, Cornell, '80-92; Assoc. Ed. Classical Review; joint Ed. Chicago Stud. in Class. Phil., former joint Ed. Cornell Stud. Class. Phil.—Aims and Methods in Class. Phil.; Sequence of Tenses in Latin *Cum*-constructions, *quod sciam*-clause, general condition in Lat., "Comparative clause," clause of Purpose.

Plautus. 4, 12, O.-D.

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PAUL SHOREY,

Ph.D., Munich, 1884; Prof. of Greek.— Leipzig, Bonn, '81-2; Am. School Class. Studies, Athens, '82-3; Prof. of Greek. Bryn Mawr, '85-92.

Æschylus and Sophocles. 4, 12, O.-D.

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Æschylus, Oresteia. 4, 6, A.-My.

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CHARLES CHANDLER,

A.M., Michigan, 1874; Prof. of Latin.— Denison; Instr. Latin, '74-6; Prof. Latin lang. and lit., '76-91.

Seneca. 4, 12, O.-D.

Tacitus (Seminar.). 2, 36, O.-Ju.

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*Tibullus and Propertius. 4, 6, Au.-S.

F. B. TARBELL,

Ph.D., Yale, 1879; Prof. of Classical Archaeology and Greek Epigraphy.—Yale: Tutor in Greek, '76-82; Asst. Prof. Greek and Instr. in Logic, '82-7; Ann. Director Am. School at Athens, '88-9; Instr. Greek, Harvard, '89-92.

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FRANK F. ABBOTT,

Ph.D., Yale, 1891; Prof. of Latin.— Yale, '82-4; Berlin, Bonn, '88-90; Tutor in Latin, Yale, '85-8, '90-1.—Colloquial Latin and Letters of Cicero.

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Ph.D., Yale, 1888; Asst. Prof. of Greek.—
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A. C. MERRIAM [absent on leave, 1894-
95],

Ph.D.; Prof. of Greek Archaeology and
Epigraphy.—Pres. Am. Philol. Ass. '86-7;
Dir. Am. Sch., Athens, '87-8; Chairman
Com. on Publicat., Athens Sch.; Chairman
Ed. Com. Archæol. Inst. Am. since 1892.—
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A.M., Ph.D., Col. — Instr. in Greek, Col.,
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H. T. PECK,

Ph.D., Columbia, 1883; Prof. of Latin
Lang. and Lit. — Columbia, '81-3; Berlin,
'88-90. — Columbia: Tutor in Latin, '84-6;
Acting Prof., '86-8. — Suetonius, Latin Pro-
nunciation, Dict. of Classic Lit. and Antiq.
Ed. (with Prof. Pease of Leland Stanford,
Jr.) Student's Series of Latin Classics.

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menos. 1, 30.

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JAMES C. EGBERT,

Ph.D., Columbia, 1885; Instr. in Latin.—
Columbia, '81-5; Berlin, summer, '91.—
Columbia: Tutor in Latin, '88-91.—Latin
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 Prof. of Greek Lit.—Göttingen, Berlin,
 Bonn.—Dir. Am. School at Athens, '82-3;
 Ed. (with others) Papers of Am. School at
 Athens, Vols. I.-IV.—Greek Gram., Anti-
 quities, History, Literature.

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 O.-Ja.

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 of Ath. Courts. 2, 31, Fe.-Ju]

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 Tennessee, '66-8, '70-3; Tutor in Greek.

Harvard, '73-4; Prof. Anc. Lang., Cin-
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 Leipzig, '76-8.—Asst. Prof. Greek and
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 Prof. Greek, Dartmouth, '78-86; Prof.
 Class. Phil., Johns Hopkins, '86-7; Sec.
 Am. Phil. Ass., '84-9; Vice-Pres. of same,
 '92-'93; Assoc. Ed. *Classical Review*, '84-pr.
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 Reformation. 3, 10, Apr.-Ju.
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 fort. this year.

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 burg, '72-4; Prof. Mod. Hist., Freiburg,
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 and English, '85-9; Prof. Hist. and Polit.
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its library, is intended for research. 1 fel-
lowship of \$500 in archaeology; 2 prizes of
\$100 each for essays on social questions.*

F. W. PUTNAM,

A.M.; Peabody; Prof. Am. Archaeology and
Ethnol.; Curator Peabody Mus.— Chief of
Dept. Ethnology, Archaeology and Hist. at
World's Columb. Expos.

Course in spec. training in archaeol.
and ethnol. during 3 yrs.; lects.,
field work, explorat. Ability to use
French and Spanish necessary.

General Anthropology, with special
reference to American archaeology
and ethnology. Lectures and
laboratory work. 1 and Lab., 31.

LELAND STANFORD, JR.

AMOS G. WARNER [see 12].

Social Pathology and Charities.
2, 32.

Seminary. 2, 32.

EDWARD A. ROSS [see 12].

Statistical and Dynamic Sociology.
2, 32.

MARY R. SMITH,

M.S.; Teacher of Hist., Washington, D.
C.—Cincinnati; Wellesley, '86-90.

Principles of Household Manage-
ment. 2, 18.

MICHIGAN.

HENRY C. ADAMS [see 12].

Critical exam. of labor and monopoly
problems. 1, 17, F.-Ju.

F. M. TAYLOR [see 12].

*Land Problems, histor. and theoret-
ically considered. 2, 17, O.-F.

*Socialism. 2, 17, F.-Ju.

*Industrial Hist. of U. S. 2, 17, O.-F.
Social philosophy with esp. ref. to
economic prob.

MINNESOTA.

SAMUEL G. SMITH,

D.D.; Pastor of the People's Church, St. Paul.

History, principles, and elements of sociology, with discussions of pauperism, crime, care of defectives, etc. Mr.-My. 3 hours per week.

PENNSYLVANIA.

Museum of American Archaeology and Ethnology.

DANIEL G. BRINTON [see 7].

Courses in Archaeolog. Exploration, esp. American; relat. of Archaeology and Ethnology.

PRINCETON.

Fellowship of \$500 in Social Science.

W. M. DANIELS,

A.M.; Asst. Prof. Political Economy.

*Public finance. 2, 16, O.-Ja.

*Hist. polit. econ. 2, 16, F.-My.

WESTERN RESERVE.

C. F. THWING,

D.D., Chicago Theolog. Sem., '88. — Pres. West. Res. Univ., 1890.

The Family as an Historical and Social Institution. S.-Ju.

M. M. CURTIS [see 8].

Anthropology. 3, S.-Ja.; or

Sociology. 3, F.-Ju.

HENRY E. BOURNE [see 10].

History of the Working Classes in Modern Times. 2, F.-Ju.

E. G. BOURNE [see 10].

Modern Socialism. 1, S.-Ju.

YALE.

W. G. SUMNER,

LL.D., Jena, 1884; Prof. Pol. and Soc. Sci. — Money, Wages, Protectionism, Soc. Classes, Elections, Biog. of Financiers.

Hist. Develop. of Mod. Indust. Organ. 2, 32.

Anthropology. 2, 32.

*Social Science. 2, 32.

14. FINE ARTS AND THE HISTORY OF ART.

[Including Classical Archaeology. See also 3 and 13.]

BROWN.

WILLIAM CAREY POLAND,

A.M., Brown, 1871; Prof. of History of Art and Director of Museum of Fine Arts. — Instr. Greek and Latin, Brown, '70-75; Berlin, Leipzig, '75-76; Asst. Prof. Gr. and Lat., Brown, '76-89; Assoc. Prof. Gr. and Cur. Mus. Class. Arch., '89-92; Director Amer. School Class. Studies, Athens, '91-92.

Classical Archaeology. 3, 34.

History of Art. 3, 34.

CHICAGO.

F. B. TARBELL [see 3].

Introduction to Classical Archaeology. 4, 12, Ja.-Mr.

Greek Life from the Monuments. 4, 12, A.-Ju.

CORNELL.

Instruction given in connection with Mus. Classical Archaeol., containing casts of sculptures and various models, etc.

ALFRED EMERSON,

Ph.D., Munich; Assoc. Prof. Class. Archaeol., and Curator of Mus. of Casts.

*Class. Archaeol. 2, 32.

*Hist. sculpt. 2, 32.

*Archaeol. sem. 2, 32.

Museum studies. 1, 32.

HARVARD.

CHARLES ELIOT NORTON,

Litt.D., LL.D.; Prof. of the History of Art.

Harvard — Continued.

- *Roman and Mediæval Art, with special study of the Development of Gothic Architecture, and of the Revival of Art in Italy in the 13th cent. 3, 31.

[*Ancient Art.] 3, 31.

Professor Norton will assist and direct advanced students in the study of special topics in the History of the Fine Arts.

LELAND STANFORD, JR.

WALTER MILLER [see 3].

- *Archæological Seminary. 1, 32.

BOLTON C. BROWN,

M.P., Syracuse Univ., 1889; Assoc. Prof. Drawing and Painting.—Instructor in Drawing, Cornell Univ., 1885-88.

- *Landscape; Casts; Life work. 4, 32.
*Drawing from Life; Still Life in Color. 3, 32.

ARTHUR B. CLARK,

M.Ar., Syracuse Univ., 1891; Asst. Prof. Drawing.

- *Scientific Perspective. 2, 18.

MICHIGAN.

M. L. D'OOGHE [see 3].

- Greek Antiquities. 1, 17, O.-F.
*Hist. of Greek art. 3, 17, O.-F.

PRINCETON.

Fellowship of \$500 in Archaeology.

ALLAN MARQUAND,

Ph.D., Johns Hopkins, 1880; Prof. Archaeology and History of Art.—Berlin, '77-8; Johns Hopkins, '78-82; Princeton: Tutor in Latin and Lecturer on Logic, '81-2; Instr. in Hist. of Art, '82-3; Ed. *Am. Jour. of Archaeol.*—Epicurean logic, logical diagr., logical machines; hist. sculpture and painting; var. Archæol. papers.

- Greek Sculpture. 2, 16, O.-Ja.
*Renaissance painting. 2, 16, F.-My.

A. L. FROTHINGHAM, JR.,

Ph.D., Leipzig, 1883; Prof. Archæol. and Hist. of Art.—Rome, '78-82; Leipzig, '83;

Johns Hopkins, '83-6; Founder and Manag. Ed. *Am. Jour. Archaeol.*—Oriental lit.; Book of Hierotheos, hist. sketch Syriac lit., Gnostic zons., etc.; bapt. of Constantine; hist. sculpt. and paint.; treas. St. Peters; var. Oriental, Early Christian, Romanesque, and Gothic archæolog. papers.

- *Romanesque art. 2, 16, O.-Ja.

- *Gothic art. 2, 16, F.-My.

Courses in Greek Architecture, Greek Industrial Arts, Greek Mythology in Art, also in Christian Architecture, Gothic Architecture, the subjects and symbols of Christian Art, Mediæval Industrial Arts and Renaissance Architecture and Sculpture have been given and may be given on application.

WESTERN RESERVE.

HAROLD N. FOWLER [see 3].

History of Ancient Art. 3, S.-Ja.

YALE.**J. M. HOPPIN,**

LL. B., Harvard, 1842; Prof. Hist of Art.—Yale, 1840; Harvard Law School, '42; Andover Sem., '45; Berlin, '47; Pastor, 9 yrs.; Prof. Homiletics and Pastoral Theol., Yale, '61-79; Lect. on Forensic eloquence Yale Law School, '72-5.—Homiletics; Theology; Essays upon Art.

History of Art (dawn of Ch. Idea in Art; orig. Mod. Art in Italy and Eu.; Byzantine Art and Rise of Saracenic Archit.; spec. topic, Gk. Art). 1, 20.

JOHN F. WEIR,

N.A., M.A., Prof. Painting and Design.

Technical Course in Painting. 4, 32.
(2 ex., each of 2 hrs.)

Course in Modelling. 4, 32. (2 ex., each of 2 hrs.)

JOHN H. NIEMEYER,

M.A.; Prof. of Drawing; Paris; Painter.

Course in Drawing. 4, 32. (2 exc., each of 2 hrs.)

15. THEORY OF MUSIC.

HARVARD.

JOHN K. PAINE,

Mus.D.; Prof. of Music.

- *Harmony. 3, 31.
- *Counterpoint. 2, 31.
- *Instrumentation. 1, 31.
- Canon and Fugue. 2, 31.
- [Free thematic music. Fugue in two voices. 2, 31.]
- *[History of Music. 1-2, 31.]
- Seminary in Music.

MICHIGAN.

A. A. STANLEY,

A.M.; Prof. of Music.

- *Canon and Fugue. 2, 34.
- *Musical Form. 2, 34.
- Free Composition. 2, 34.
- Instrumentation. 2, 34.

PENNSYLVANIA.

H. A. CLARKE,

Mus.D.; Prof. of Music.

- *Harmony.
- *Counterpoint and Composition.

YALE.

HORATIO W. PARKER,

M.A., Yale. — Boston, Munich, 1882-5; Organist, Dedham, Mass. 1880; Boston Highlands, 1886; Harlem, 1888; N. Y. City, 1889; Trinity ch., Boston, 1893-4. — Composer: concert music, songs, part songs, oratorio.

- *Harmony. 2, 32.
- *Counterpoint; Canon; Fugue. 2, 32.
- *Forms. 1, 32.

SAMUEL S. SANFORD,

Organist, Pianist, Choral Director, Critic.

Courses on Organ or Pianoforte.

III. PURE SCIENCE.

16. MATHEMATICS.

BROWN.

NATHANIEL FRENCH DAVIS,

LL.D., Colby, 1894; Professor of Pure Mathematics.—Instr. Mathematics, Brown, '74-79; Asst. Prof., '79-89; Assoc. Prof., '89-90; Göttingen, Berlin, '92-93.

Applications of the Calculus. 3, 12, Ja.—Mr.

HENRY PARKER MANNING,

Ph.D., Johns Hopkins, 1891; Instructor in Mathematics.—A.M., Brown, 1886; Fellow, Johns Hopkins, '90-91.

Theory of Functions. 3, 34.
Modern Algebra; Higher Plane Curves and Surfaces. 3, 34.

[Offered '95-96, in place of former.]

Theory of Functions (adv.). 1, 34.
Differential Equations. 3, 24, S.—Mr.
Special courses to meet needs of graduate students

BENJAMIN FRANKLIN CLARKE,

A.M., Brown, 1866; Prof. Mechanical Engineering.—Instructor Mathematics, Brown, '63-68; Prof. Mathem. and Civil Engineering, '68-93.—Theoretical and Experimental Mechanics.

Mechanics of Solids. 3, 34.
Mechanics of Fluids. 3, 34.
Theory of Structure. 3, 10, A.—Ju.

OTIS EVERETT RANDALL,

A.M., Brown, 1887; Assoc. Prof. of Mechanical Drawing.—Instr. Math. and Eng., Brown, '85-91; Asst. Prof. Math. and Civil Eng., '91-92.

Shades, Shadows and Perspective. 3, 12, S.—D.

Machine Drawing. 3, 12, Ja.—Mr.
Constructive Geometry. 3, 12, S.—D.

EDWARD CLIFTON BURNHAM,

B.S., Mass. Inst. Techn., 1890; Instr. Mechan. Drawing and Engineer.—A.E., Brown, '86.

Gearing. 3, 10, Mr.—Ju.

ERNEST HENRY BROWNELL,

B.S., Mass. Inst. Tech.; Instructor in Civil Engineering.

Hydrographic Surveying. 3, 12, S.—D.

Hydraulics. 3, 22, Ja.—Ju.

Structures. 6, 12; 6, 12; 3, 10.

Masonry. 3, 10.

Geodesy. 1, 10.

BRYN MAWR.

1 fellowship of \$525.

CHARLOTTE ANGAS SCOTT,

D.Sc., London; Prof of Mathematics.—Cambridge, Eng., '80-3; Res. Lect. in Math., Girton Coll., '80-4; Lect.; Newnham Coll., Cambridge, '80-3; Cubics and higher singularities, binomial equation.

Sem.: Anal. Geom. 1, 30.

High. Plane Curves. 2, 30.

*Modern Higher Algebra. 2, 30.

Introd. to Mod. Anal. Geom. 2-3, 30.

JAMES HARKNESS,

M.A., Cambridge and London; Assoc. Prof. Math.—Schol., Trinity Coll., Cambr., '82-8; Math. Schol., London, '87.—Theory of functions.

Differential equations (adv.). 3, 30.

Theory of Groups. 3, 30.

*Differential equations. 3, 15; 2, 15.
[Dynamics. 2, 15.]

CALIFORNIA.

I. STRINGHAM,

Ph.D., Johns Hopkins; Prof. Math.

Mathematical Seminary.

Absolute Geometry.

Theory of Functions of Real Variables.

G. C. EDWARDS,

Ph.B; Assoc. Prof. Math.

Differential equations.

M. W. HASKELL,
Ph.D., Göttingen; Assoc. Prof. Math.
Theory of Substitutions.
Theory of Numbers.

A. B. PIERCE,
A.M., Harvard; Inst. Math.
Quaternions.

CHICAGO.

Math. club and sem. of all instrs. and grad. studs. meets fortnightly.

E. HASTINGS MOORE,
Ph.D., Yale, 1885; Prof. of Mathematics.—
Yale, '83-5; Berlin, '85-6; Tutor of Math.,
Yale, '87-9; Northwest Univ.: Asst. Prof.
Math., '89-91; Assoc. Prof. Math., '91-2.—
Geometry of n dimensions; algebra;
groups.

Theory of functions, complex variable. 4, 12, Jul.-S. 1894 and 1895.

Elliptic functions. 4, 12, Jul.-S. 1894.

Functions seminar. Fortnightly, Jul.-S. 1894 and 1895.

Projective geometry. 4, 12, O.-D.

Elliptic modular functions. 4, 12, O.-D.

Configurations. 4, 12, A.-Ju.

Groups. 4, 12, A.-Ju.

Linear differential equations. 4, 12, Jul.-S. 1895.

OSKAR BOLZA,

Ph.D., Göttingen, 1886; Prof. Math.—
Berlin, Heidelberg, Strassburg, Göttingen;
Reader in Math., Johns Hopkins, '88-9;
Assoc. in Math., Clark, '89-92; Assoc.
Prof. Math., Chicago, '92-93.—Hyperelliptic
functions and theory of substitutions.

Theory of functions, complex variable. 4, 12, O.-D.

Quaternions. 4, 12, O.-D.

Analytic geometry of three dimensions. 4, 12, Ja.-Mr.

Theory of substitutions with applications to algebr. eqs. 4, 12, Ja.-Mr.

HEINRICH MASCHKE,

Ph.D., Göttingen, 1880; Asst. Prof. Math.
and Physics.—Heidelberg, Breslau, Berlin,
Göttingen; Prof. Math., gymnasium at
Berlin, '80-90.—Orthogonal systems of surfaces;
finite groups of linear substitutions.

Higher plane curves. 4, 12, O.-D.
Weierstrass's theory of elliptic functions. 4, 12, Ja.-Mr.
Analytic mechanics. 4, 12, A.-Ju.
Algebraic surfaces. 4, 12, A.-Ju.
Theory of surfaces; differential geometry. 4, 12, Jul.-S. 1895.
Theory of the icosahedron. 4, 12, Jul.-S. 1895.

J. W. A. YOUNG,

Ph.D., Clark, 1892; Instructor of Math.—
Berlin, '88-9; Clark, '89-92; Tutor in
Math., Chicago, '92-94.—Groups.

Elements of theory of invariants,
with application to higher plane curves. 4, 12, Jul.-S. 1894.

Theory of numbers. 4, 12, Jul.-S. 1894.

Theory of numbers. 4, 12, Ja.-Mr.

JAMES H. BOYD,

D.Sc., Princeton, 1892; Tutor in Math.—
A.B., Princeton, '86-7; Fellow in Math.,
ibidem, '86-7; A.M., *ibidem*, '88; Göttingen,
'89-90, '92-3; Prof. Math., Macalester College,
'87-90, '91-2.

Differential equations. 4, 12, A.-Ju.

HARRIS HANCOCK,

A.B., Johns Hopkins, 1888; Assistant in
Math.—Johns Hopkins, '88-91; Berlin,
'91-2, '93-4.

Calculus of variations. 4, 12, Ja.-Mr.

CLARK.

2 fellowships of \$600 each; 2 fellowships of \$400 each; 2 scholarships of \$200 each, and 2 scholarships of \$100 each,—all assigned to students in Mathematics.

WILLIAM EDWARD STORY,

Ph.D., Leipzig, 1875; Prof. of Math.—
Berlin, Leipzig, '71-5; Tutor in Math., Harvard, '75-6; Assoc., Asst. Prof. and Assoc.
Prof. of Math., Johns Hopkins, '76-'89;
Assoc. Ed. *Amer. Jour. Math.*, '78-82.—
Algebraic variants and co-variants, non-Euclidean geom., analyt. geom. (esp. higher plane curves), elliptic functs.

Linear and Higher Uniform Transformations of Curves and Surfaces. 4, 18, O.-F.

Discrete and Continuous Groups. 3, 17, F.-Ju.

Clark — Continued.

Seminary for Advanced Students.
35, O.-Ju.
Modern Synthetic Geometry. 2, 17,
F.-Ju.

HENRY TABER,

Asst. Prof. of Math.—Ph.D., Johns Hopkins, 1888; Asst. in Math., Johns Hopkins, '88-9; Docent in Math., Clark, '89-92.—Theory of Matrices.

Analytic Geometry of Conic Sections, Quadric Surfaces, and Higher Plane Curves. 3, 35, O.-Ju.
Theory of Functions of Real and Imaginary Variables and Definite Integrals. 3, 35, O.-Ju.
Seminary. 2, 35, O.-Ju.

JOSEPH DE PEROTT,

Docent in Mathematics, Paris, Berlin, '77-80.—Theory of numbers; topology; substitutions.

Riemann's Surfaces and Abelian Integrals. 2, 17, F.-Ju.
Theory of Numbers. 2, 18, O.-F.

COLUMBIA.

Prof. J. H. Van Amringe, Dr. T. S. Fiske, Mr. James Maclay and Dr. C. M. Blake offer, for '94-95, the following advanced courses:

Adv. diff. and integ. calculus. 3, 30.
Gen. diff. equations. 3, 15.
[Theory of invariants. 3, 15.]
[Theory of substitutions. 3, 15.]
Gen. theory of functions. 3, 15.
Elliptic functs. 3, 15.
Abelian functs. 3, 15.
Automorphic functs. 3, 15.
Theory of curved surfaces. 3, 15.
Continuous Transformation Groups. 3, 15.

CORNELL.

Any course not desired by at least 5 students may not be given.

J. E. OLIVER,

A. M.; Prof. of Mathematics.
Theory of functs. 3.
Theories of num. 2.

Quatern. and vector anal. 2, 20,
Ja.-My.
Non-euclidean geom. 2.
Math. pedagogy. 1.
Math. essays and theses. 1.
Mathem. theory of electricity. 2, 32.

L. A. WAIT,

A.B.; Prof. of Math.
Advanced Analytic geom. 2, 32.
Adv. differential and integ. calc. 2, 32.
Rational mechanics. 2, 32.

JAMES MCMAHON,

A.M.; Asst. Prof. Math.—Trinity Coll., Dublin; Cornell; Cambridge, Eng.; Instr. in Math., Cornell, '84-90; Assoc. ed. *Ann. of Math.*—Modern algebra, higher plane curves.

Adv. analytic geometry. 2, 32.
Gen. theory of algebraic curves and surfaces. 2, 32.
Theory of quantics (Salmon and Clebsch). 2, 32.
Mathem. theory of chemical equilibrium (with Prof. Trevor). 2, 32.

G. W. JONES,

A.M.; Asst. Prof. of Math.
Lines and surfaces of 1st and 2d orders. 3, 32.
Mod. synthetic geom., inc. projective geom. 2, 32.
Higher algebra (sem.). 2, 32.

C. S. FOWLER,

B.S.; Instr. in Math.
*Adv. trigonometry, inc. theory of imaginaries and hyperbolic functs. 2, 32.
Finite diff. factorials, diff. eq., with ref. to pract. comput. 2.
Theory of prob.; least sq. and applic. 2, 12, O.-D.

MR. SAUREL.

The potential funct. and spher. harmonics. 2, 32.
Binary quantics. 2, 32.

HARVARD.

Chauncey Wright Math. prize of \$25.

J. M. PEIRCE,

A.M., Harvard, 1856; Perkins Prof. Mathematics.

Quaternions, with applications to Geometry and Mechanics (second course).

[*Quaternions, with applic. to geom. and mechan. (first course). 3, 31.]

[Alt. with course above.]

*Algebraic plane curves: gen. theory, esp. cubics. 3, 31.

Algebra of Logic. 2-1, 31.

Linear Associative Algebra (research). 1, 31.

[Gen. Theory of Curves and Surfaces (second course)].

[Given in 1895-96.]

W. E. BYERLY,

Ph.D., Harvard, 1873; Prof. Mathematics.—Harvard, '71-73; Asst. Prof. Math., Cornell; Asst. Prof. Math., Harvard.—El. geom., diff. calculus, integ. calculus, spherical harmonics.

*Fourier's series, spher. harmonics. 2, 31.

*Mod. methods in geom. 3, 31.

*Diff. and integ. calculus (adv.). 3, 31.

[Analyt. Mechanics.] [Given in '95-96.] Mechanics of rigid bodies. 2, 31.

B. O. PEIRCE [see 18].

Methods in Mathematical Physics. 3, 31.

[Hydrostatics. Hydrokinematics. Force Functions and Velocity. Potential Functions and their uses. 3, 31.]

[Alt. with course above, given in 1895-96.]

Potential Function. 1, 31.

W. F. OSGOOD,

Ph.D., Erlangen, 1890; Instr. in Math.—Harvard, '86-87; Göttingen, '87-91; Erlangen, '89-90.—Symbol. notation, system of two simultaneous ternary quadrat. forms.

*Higher algebra. 3, 31.

*Theory of functions. 3, 31.

(Of these two, one only will be given.)

Klein's Isocahedron (research).

[Theory of Substitutions.]

MAXIME BÔCHER,

Ph.D., Göttingen, 1891; Asst. Professor of Math.—Göttingen, '88-91; Instructor in Math., Harv., '91-93.—Math. theory of the potential.

Theory of functions. 3, 31.

*Theory of equations. 2, 15, F.-My. Curvilinear Coörd's and Lamé's Functions. 3, 31.

Theory of Functions satisfying Laplace's Equation (research).

JOHNS HOPKINS.

SIMON NEWCOMB [see 17].

THOMAS CRAIG,

Ph.D., Johns Hopkins, 1876-79; Prof. Pure Mathematics.—Asso. Ed. *A. M. Jour. Math.*

Theory of functions (adv.). 3, 15, O.-Ja.

Abelian functions. 3, 15, O.-Ja.

Differential equat. 3, 15, F.-My.

Elliptic functions. 3, 15, F.-My.

Seminary. 2, 30.

FABIAN FRANKLIN,

Ph.D., Johns Hopkins, 1880; Prof. Math.

Theory of functions (el.). 2, 30.

Theory of invariants. 3, 30.

A. S. CHESSIN,

Theoretical dynamics. 3, 15, F.-My.

Partial differential equa. 3, 15, O.-Ja.

L. S. HULBURT,

A.M., Wisconsin, 1888.—Clark, '91-2.

Theory of plane curves. 4, 15, O.-Ja.

Surfaces and twisted curves. 2, 15, F.-My.

LELAND STANFORD, JR.

R. E. ALLARDICE,

A.M., University of Edinburgh, 1882; Prof. of Mathematics.—Baxter Scholar, '83-84; Drummond Scholar, '83-4; Asst. Prof. of Math., Univ. of Edinburgh, '83-92.—Algebra; geometry.

*Differential equations. 3, 32

Function theory. 2, 32.

Leland Stanford, Jr. — *Continued.*

C. N. LITTLE,

Ph.D., Yale, 1885.—Prof. of Mathematics, Yale, '79-80; '84-85; Instructor Math. and Civ. Eng., Nebraska State University, '80-84; Assoc. Prof. and Prof. Civ. Eng., Neb. Univ., '85-93. Geometry; Knots.

- *Coördinate Geometry. 2, 32.
Quaternions. 3, 32.

R. L. GREEN,

A.M., Indiana Univ., '90.—Johns Hopkins Univ., '86-87; Asso. Instructor in Mathematics, Ind. Univ., '85-86; Prof. Math., Ind. Univ., '87-93.

Higher Plane Curves. 2, 32.

R. J. ALEY,

A.M., Indiana University, '890; Asst. Prof. Math.—Prof. Mathematics, Indiana Univ., 1891-94.

- *Analytical Statics. 2, 32.

MICHIGAN.

WOOSTER W. BEMAN,

A.M., 1873; Prof. Mathematics.—Algebra; analyt. geom.; calculus.

- *Quaternions. 3, 17, F.-Ju.
*Teacher's Seminary. 2, 34.
Solid Analyt. Geom. 2, 34.
Differential Equations. 2-3, 34.
Mathematical reading. 3, 34.

FRANK N. COLE,

Ph.D.; Asst. Prof. Math.—Harvard, Leipzig, Göttingen.

- Theory of substitutions.
Theory of complex numbers. 3-2, 34.
*Projective Geom. 3, 34.

ALEXANDER ZIWET,

C.E.; Asst. Prof. Math.—Moscow; Polytech. School, Karlsruhe.—Co-Ed. *Bull. N. Y. Math Soc.*—Theoretical Mechanics.

Advanced Mechanics. 2-3, 34.

JOSEPH L. MARKLEY,

Ph.D., Harvard, 1889; Instr. in Math.

- *Modern higher algebra. 3, 17, F.-Ju.
*Fourier's series, spherical, cylind. and elliptical harmonics. 2, 34.

MINNESOTA.

JOHN F. DOWNEY,

A.B., Hillsdale College, '70; M.A., Univ. of Mich.; Prof. of Math. at the Penn. State College, '75-80; since 1880, Prof. of Math. at the Univ. of Minn.

- Advanced Work in Coördinate Geometry.
Advanced Work in Differential Calculus.
Advanced Work in Integral Calculus.
Quaternions. Once a week throughout the year.

PENNSYLVANIA.

The Rogers Library of Mathematics, Astronomy, Physics, and Civil Engineering.

E. S. CRAWLEY,

Ph.D., U. of Penn., '92; Asst. Prof. Math.—Sub-Dean of College, Univ. of Penn.—Trigonometry; Mathematics.

- Higher Plane Curves. 2, 15.
Theory of Numbers. 2, 30.
*Least Squares. 2, 15.
*History of Mathematics. 1, 30.

G. E. FISHER,

A.B.; Asst. Prof. Math.—Cornell, U. of Penn.; Instr. Math., Cornell, '87-89.—Mathematics.

- Advanced work in Analytic Geometry of two and three dimensions. 2, 30.
Advanced work in Differential and Integral Calculus. 2, 30.
Projective Geometry. 2, 30.
Quaternions. 2, 30.
Modern Higher Algebra. 2, 30.
Differential Equations. 2, 30.
Theory of Functions. 2, 30.
Seminar. 1, 30.

J. J. SCHROATT,

Ph.D., '93, U. of Penn.; Instr. in Math.—Berlin, Riga Dorpat.—Mod. Geom.; Bessel's Functions.

- Modern Geometry. 2, 30.
Theory of substitutions and applications. 2, 30.
Abelian functions.

PRINCETON.

H. B. FINE,

Ph.D., Leipzig, 1885; Prof. of Mathematics. — Princeton, '80-1; Leipzig, '84-5; Princeton: Tutor, Asst. Prof. and Prof. of Math. since '81. — Singularities of curves of double and multiple curvature; differential eq.; the number syst. of Algebra.

Differential eq. 2, 32.

Theory of numbers and higher algebra. 2, 32.

Higher metric geom. 2, 32.

H. D. THOMPSON,

D.Sc., Princeton; Ph.D., Göttingen; Prof. Math. — Princeton, '85-6; Fell., Johns Hopkins, '86-7; Göttingen, '87-8, '90. — Zero-value of ellipt. theta-functs.; pencils of conics; hyperelliptic functs. Euclid.

*Higher plane curves. 2, 32.

Analyt. geom. of 3 dimens. 2, 32.

Elliptic functions. 2, 32.

W. F. MAGIE [see 18].

*Analyt. mechanics. 2, 32.

VANDERBILT.

W. J. VAUGHN,

M.A., LL. D.; Prof. Mathematics.

*Solid Geometry. 1, 16.

*Theory of Equations. 2, 16.

*Differential Equations. 3, 16.

Theory of Groups. 3, 16.

Theory of Numbers. 3, 16.

WESTERN RESERVE.

C. J. SMITH,

A.M., West. Res. Coll., 1873; Prof. Mathematics. — Prof. Mathematics, West. Res. Coll., 1870-82; Adelbert, '82.

*Differential and Integral Calculus. 3, S.-Ju.

*Analytic Geometry. 3, F.-Ju.

*Theory of Equations. 3, F.-Ju.

A. H. PALMIÉ,

Ph.B., Cornell, '90; Assoc. Prof. Mathematics. — Fellow in Math., Cornell, '90-91; Instructor in Math. and German, Coll. for Training of Teachers, N. Y. City, '91-92; Instructor in Mathematics, Coll. for Women, W. R. U., '92.

Higher Plane Curves. 3, S.-Ja.

Theory of Functions. 3, S.-Ja.

Quaternions. 3, F.-Ju.

*Differential Equations. 3, F.-Ju.

*Projective Geometry. 3, F.-Ju.

WISCONSIN.

CHARLES A. VAN VELZER,

Ph.D., Johns Hopkins; Prof. of Mathematics.

Modern Algebra. 2, 36.

Analytic Geometry of two dimensions. 3, 36.

Analytic Geometry of three dimensions. 3, 36.

CHARLES S. SLICHTER,

M.S.; Professor of Applied Mathematics.

Newtonian potential functions. 2, 36.

Partial differential equations of math. physics. 2, 36.

Theoretical hydrodynamics. 2, 36.

ERNEST B. SKINNER,

A.B.; Instructor in Mathematics.

Quaternions. 2, 36.

EDWARD B. VAN VLECK,

Ph.D.; Instructor in Mathematics.

Projective Geometry. 2, 36.

YALE.

Math. Club holds fortnightly meetings for papers and discussion. Hillhouse Math. Coll., 3000 vols.

HUBERT A. NEWTON,

LL.D., Michigan, 1868; Prof. of Mathematics. — Meteors, comets, temperature, metric system, transcendental curves.

Analytical statics.

*Integral calculus and mechanics. 3, 32.

*Shooting stars and meteors. 1, 32.

J. E. CLARK,

A.M.; Prof. of Mathematics.

Determinants and Differential Equations. 2, 32.

J. W. GIBBS [see also 18],

Ph.D., Yale, 1863; Prof. Mathematical Physics. — Thermodynamics; theory of light; Vector analysis.

Yale — Continued.

Vector Analysis (el.). 2, 12, O.-D.
Vector Analysis (adv.). 2, 20, J.-Ju.

Miscellaneous Applications of Vector Analysis. 1, 32.

Multiple Algebra. 1, 32.

[Given 1895-96.]

C. B. RICHARDS,

M.A., Yale, 1884; Prof. Mechan. Engineer.—Exper. on Resist. of stones to crushing; Warming and vent. of Houses; Revis. of def. in Mech. and Eng. in *Webster's Internat. Dict.*; Gen. Rev. of 6th group, and Rep. on Class 52; 240 pp. in Rep. U. S. commis. to Univ. Expos. of 1889, Paris.

Mechan. Engineering.

Applied Mechanics.

Machine Design.

Thermodynamics.

A. J. DuBOIS,

C. E., 1870; Ph.D., 1872; Prof. Civil Engineer.—Formerly Prof. Civ. and Mech. Engineer., Lehigh Univ.—Elements of Grap.

Statics, Hydraulics, Hyd. motor and Steam Engine.

Civil Engineering.

Mechanics applied to Engineering.

Construction and Design.

WM. BEEBE [see 17].

Surveying. 3, 16, F.-Ju.

A. W. PHILLIPS,

Ph.D., Yale, 1877; Prof. Math.—Orbits; Math. curves and their graphic representation, esp. by machines.

Curves and Cones. 1, 32.

*Analyt. Geom. 2, 32.

IRVING FISHER,

Ph.D., Yale, 1891; Asst. Prof. Math.—Math. Econ.

Courses not yet announced.

JOSEPH BOWDEN,

A.B., Yale, 1891; Tutor in Math.

*Algebra. 2, 32.

17. ASTRONOMY.**BROWN.****WINSLOW UPTON,**

A.M., Univ. of Cincinnati, 1877; Professor of Astronomy and Director of Ladd Observatory.—Asst., Harvard Coll. Observatory, '77-79; Asst. Engineer, U. S. Lake Survey, '79-80; Computer, U. S. Naval Observ., '80-'81; computer and Junior Prof. of Meteorol., U. S. Signal Office, '81-83.—Graduate Instruction at Ladd Observ.

Advanced Practical Astronomy. 3, 34.

Individual courses as desired.

CALIFORNIA.

The Lick Observatory is a department of the University, and the great telescope affords unrivalled facilities for advanced astronomical work. For less mature graduate students, the following courses are given at the Observatory at Berkeley:

A. O. LEUSCHNER,

A.B., Michigan; Asst. Prof. Math.

Practice in Observing.

History of Astronomy.

Method of Least Squares.

Mechanical Quadratures.

Interpolation and use of Tables.

CHICAGO.**S. W. BURNHAM,**

Prof. of Practical Astronomy; A.M., Yale Univ., 1878.—Observer of the Dearborn Observatory, Chicago, 1877-81, 1882-4; Observer at the Washburn Observatory, Madison, Wis., 1881-2; Astronomer at the Lick Observatory, 1883-92; Associate Editor of *Astronomy and Astro-Physics*.—19 catalogues of new double-stars.

Micrometrical measures of Double-stars, and Nebulae.

Orbits of Binary Stars.

GEORGE E. HALE,

Associate Prof. of Astro-Physics, and Director of the Observatory; S.B., Massachusetts Institute of Technology, 1890.—Di-

rector of the Kenwood Astro-Physical Observatory, 1890; Prof. of Astro-Physics in Beloit College, 1891; Lecturer in Astro-Physics at Northwestern Univ., 1891; Editor of *Astronomy and Astro-Physics*.—Solar Photography, Solar Spectra, Solar Faculae, Spectra of the Elements, the Spectro Heliograph.

Astronomical Photography. 4, 12, O.-D.

Solo Physics. 4, 24, Ja.-Ju.

Stellar Spectroscopy. 4, 12, O.-D.

Astro-Physical Research. 4, 48, Jul.-Ju.

T. J. J. SEE,

Ph.D., Berlin, 1892; Assistant in Astronomy.—Docent in Astronomy, the Univ. of Chicago, 1892-3.—Development of Double-stars; law of attraction in the stellar systems; ancient color of Sirius; orbits of double-stars; secular perturbations of Uranus.

Gauss's Method of Computing Secular Perturbations. 4, 12, Jul.-S.

Theory of Attractions and Figures of the Heavenly Bodies. 4, 12, Jul.-S.

Math. Theory of Tides. 4, 24, O.-Mr.

Tidal Friction and Cosmogony. 4, 12, A.-Ju.

Seminar. 4, 48, Jul.-Ju.

KURT LAVES,

Ph.D., Univ. of Berlin, 1891; Docent in Astronomy, Univ. of Chicago, 1893-4; Reader in Astronomy.—The Mass of Moon; the Lunar Equation; the principal term of the Nutation.

Latitude and Longitude. 4, 12, Jul.-S.

Spher. and Prac. Astronomy. 4, 12, O.-D.

Partial Diff. Equations. 4, 12, O.-D.

Dynamics of a System. 4, 12, Ja.-Mr.

Spherical Astronomy. 4, 12, Ja.-Mr.

Special Perturbations. 4, 12, A.-Ju.

Rotating Body. 4, 12, A.-Ju.

Seminar. 2, 48, Jul.-Ju.

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JOHN K. REES,

A.M.; E.M., Columbia, 1875; Prof. of Astronomy and Dir. of Observatory.—Asst. Math., Columbia, '73-76; Prof. Astr., Washington U., '76-81; Prof. Pract. Astron. and Geodesy, Columbia, '81-92; Ed. *School of Mines Quarterly*, '82-88.—Solar eclipses, comets and meteors, Rutherford reductions.

Adv. Sph. and Pract. Astron. (with Prof. Jacoby.) 2 h. lect. and 4 h. obs. work for 2 yrs.

HAROLD JACOBY,

A.B.; Instr. in Astron.—Asst. Astr. U. S. Eclipse Exped. to W. Africa, '89-90; Ed. *Bull. N. Y. Math. Soc.*—Astron. photog.; star clusters, stellar parallax.

Theoretical Astron.

Thr. and computations. 2 yrs.

Theory and Methods of Reduction of Photographic Star Plates. 1 h. for 2 yrs.

CORNELL.

J. E. OLIVER [see 16].

Celestial Mechanics. 2, 32, or 64.

W. R. SHOEMAKER,

B.S.; Instr. in Math.

Desc. and theoret. ast. 2, 32.

Phys. and math. ast. 2, 32.

E. A. FUERTERS.

Spherical astronomy. Observations, 2, 12.

HARVARD.

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JOHNS HOPKINS.

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Johns Hopkins—Continued.**SIMON NEWCOMB,**

Ph.D., hon., Leyden, 1875.—Heidelberg, '86; LL.D., Yale, '75; Harvard, '84; Columbia, '87; Edinburgh, '91; D.Sc., Dublin; Prof. Math. and Astron.; Sen. Prof. Math., U. S. Navy; Supt. Am. Ephemerid. and Naut. Almanac; Ed. *Am. Jour. Math.*

C. L. POOR,

Ph.D., Johns Hopkins, 1892; Assoc. in Astron.

Theory and use of astron. instrum. 3, 15, O.—Ja.

Adv. Theoret. astron. 3, 15, F.—My.

Theoret. and prac. astron. 2, 30.

Astron. seminary.

Prac. work with instrum. Daily.

A. S. CHESIN,

Ph.D.; Lecturer on Math. and Ast.

Celestial mechanics. 3, 30.

LELAND STANFORD, JR.

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W. J. HUSSEY,

B.S., C.E., Michigan, 1889; Assoc. Prof. of Astronomy.—Nautical Almanac Office, 1889; Acting Director, Detroit Observatory, 1891–92; Lick Observatory, 1892–93.—Logarithms; Theories of Planetary Motions; Mars.

*Spherical astronomy. 2, 15.

*Method of least squares and empirical curves. 2, 15.

*Eclipses and occultations, theory and computations. 2, 19.

Orbits of double stars, graphical and analytical methods. 2, 19.

Theoretical astronomy, orbits of comets and planets, ephemerides and special perturbations. 5, 34.

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ASAPH HALL, JR.,

Ph.D., Yale, 1889; Prof. Astron. and Dis. Observ.—Yale, '85–90; Asst. Naval Obs., '82–85; Asst. Astron., Yale Obs., '85–89; Asst. Astron., Naval Obs., '89–92.—Observations of satellites and discussion of observations.

*Theoretical astron. 5, 34.

Math. theory of planetary motions. 2, 17, O.—F.

*Use of instruments. 17, O.—F.

SIDNEY D. TOWNLEY,

M.S.; Instr. in Astron.

*Least squares and empirical curves. 3, 34.

*Spherical astron. 3, 34.

MINNESOTA.**FRANCIS P. LEAVENWORTH,**

M.A., Univ. of Virginia; Asst. Prof. of Ast.—Indiana State Univ.; Cincinnati Univ.; Director of Observatory and Prof. of Ast. at Haverford College.—Articles in astronomical magazines.

Practical Astronomy. 4, 13.

Orbit work.

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C. A. YOUNG,

Ph.D., LL.D.; Prof. of Astronomy.

Theoret. astron. 1, 32 (with Prof. Reed).

TAYLOR REED,

A.M.; Asst. Prof. Astron.

Pract. Astron. 2, 32.

VANDERBILT.**L. C. GARLAND,**

A.M., LL.D.

*Descriptive Astronomy. 4, 16.

C. L. THORNBURG,
C.E., '83; Ph.D., '84, Vanderbilt.
Practical Astronomy. 3, 32.
Observatory Practice. 6, 32.

WISCONSIN.

GEORGE C. COMSTOCK,
Ph.B., Michigan; Professor of Astronomy
and Director of the Washburn Observatory.
Observatory work and methods. 10,
10, A.-Ju.
Theoretical Astronomy. S.-Ju.

Graduate students will be received as
assistants at the Washburn Obser-
vatory, and offered facilities for
conducting independent investiga-
tions.

YALE.

WILLIAM BEEBE,
A.B., 1873; Asst. Prof. Math. and Astron.—
Comets' orbits; graphic algebra; mechanics.
*Descriptive Astronomy. 3, 16, O.-F.
*Practical Astronomy (observ. work).
1, 32.

18. PHYSICS.

[See also 16 and 17.]

BROWN.

ELI WHITNEY BLAKE,
A.M., Univ. of Vermont, 1869; Hazard
Prof. of Physics. — A.B., Yale, '57; Yale,
'59; Heidelberg, Marburg, Berlin, '62-65;
Prof. Chem., Univ. of Vermont, '67-68; Prof.
Physics, Cornell, '68-70.
Photography. 1, 10, A.-Ju.
Laboratory. 3 (6), 24, S.-Mr.

ALBERT DE F. PALMER,
B.P., Brown, 1891; Instructor in Physics.—
Johns Hopkins, '91-93.
Dynamics. 3, 12, S.-D.
Thermodynam. 3, 12, Ja.-Mr.

BRYN MAWR.

A. S. MACKENZIE,
A.B.; Assoc. in Physics.—Johns Hopkins,
'89-91.
[Theory of elec. and magnet. 2, 30.]
[Theory of wave motion. 3, 15, F.-
My.]
Physical optics. 3, 30.
Elec. and magnet. 3, 30.

DR. BUCKINGHAM.
Thermodynamics. 2, 30.
Theory of solutions. 2, 15, F.-My.

CALIFORNIA.

F. SLATE,
B.S., Brooklyn Polytechnic; Prof. Physics.
Dynamics of Rotation. Stresses and
Strains in Elastic Solids.
Historical Development of Physical
Theories.
Analytic Mechanics.

H. WHITING,
Ph.D., Harvard; Assoc. Prof. Physics.
Special Research in Color and Light.
Lect. and Lab. Exercises in Sound.

W. J. RAYMOND,
B.S.; Inst. Physics.
Absolute Electrical Measurements.
Harmonic motion.

F. G. HESSE,
Grad. Gewerke Institut., Treves; Prof.
Mechan. Engin.
Hydrodynamics.
Hydraulics and Hydraulic Machinery.
Thermodynamics.
Dynamics of Heat Engin.
Mechanical Laboratory.

C. L. CORY,
M.M.E., Cornell; Assoc. Prof. Mechan.
Engin.
Electrical Engineering.
Problems in Electricity.

CHICAGO.

A. A. MICHELSON,

Ph.D., hon. W. Reserve, '86; Stevens Inst., '87; Head Prof. Physics.—Instr. Phys., U.S. Naval Acad., '75-9; Prof. Physics, Case School, '83-9; Prof. Physics, '89-92.

Research course. 2, 36, O.-Ju.

Lects. in theoret. physics. L 10-18, 36, O.-Ju.

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ARTHUR G. WEBSTER,

Ph.D.; Asst. Prof. Physics.—A.B., Harvard, 1885; Instructor in Math., Harvard, 1885-6; Parker Fellow, 1886-9; Berlin, Paris, Stockholm, 1886-90; Ph.D., Berlin, 1890.

Dynamics. General Methods, Canonical Equations, Systems of Particles, Rigid Bodies. 40 L.

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Ph.D., Wütrzburg, 1881; Adj. Prof. Physics.—Asst. Phys. Inst., Wütrzburg, '81-2; Physicist U. S. Geol. Survey, '82-91; Sr. asst. Astrophys. Obs., Smithsonian, '91-2; Prof. Physics, Columbian U., '84-6.—Indices of refraction, electric polariz., flow of solids, chem. action bet. solids, alloy, thermo-elec. of high temp. geysers, thermal expan. rocks, spec. gravs.

Electricity; exact phys. measurements. 2, L 8, 30.

Theoretical comparison of electr. methods. Undulat. theory of Light. 2, 30.

OGDEN N. ROOD,

A.M.; Prof. of Physics.

Light; heat. 3, L 4, 30.

Sound; electricity. 2, L 6, 30.

H. CUSHMAN,

A.B.; Instr. in Physics.

Precision of Measurements. 2, F.-My.

Laboratory Courses.

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Minor Courses, First Year.

Electromotive force of Standard and Constant Cells.

Study of Strength of Electric Currents.

Study of Elasticity of Solid Bodies.

Colorimetry, and Absorption Spectra.

Photometry.

Minor Courses, Second Year.

Calibration of Wheatstone Bridges.

Hypsometry.

Determination of Index of Refraction by Special Methods.

Quantitative Examination of the Discharge of the Induction Coil.

Viscosity of Solids.

Major Courses, First Year.

Galvanometer Construction for Maximum Efficiency.

Advanced Course in Spectrometry.

Ballistic-galvanometer Work.

Calorimetry.

Radiant Heat.

Interference of Light.

Polarized Light.

Acoustic Measurements.

Thermo-electricity.

Electrical Conduction.

Electrical Insulation.

M. I. PUPIN,

Ph.D.; Adjunct Prof. of Mechanics.

Thermodynamics. 3, O.-Ja.

Theoret. Elect. Engineering (el.). 3, O.-Ja.

Theory of Direct-Current Dynamo. 3, F.-My.

Theory of Alternators and Transformers. 3, O.-Ja.

Theory of Variable Currents. 3, F.-My.

Maxwell's Theory of Electricity and Magnetism. 2, 30.

Theory of Bessel's Functions and Spherical Harmonics. 1, 30.

Electromagnetic Theory of Light. 3, O.-Ja.

Advanced Thermodynamics. 2, 30.

Advanced Theoretical Electrical Engineering. 3, F.-My.

K. S. WOODWARD,

C.E., Ph.D.; Professor of Mechanics.

Elem. Thermodynamics. 2, O.-Ja.

Adv. Theoret. Mech. 2, 30.

Potential Function. 2, 30.

Elasticity. 2, 30.

J. C. PFISTER,

A.B.; Tutor in Mechanics.

Theoret. Mech. (el.). 2, 30.

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EDWARD L. NICHOLS,

Ph.D., Göttingen, 1879; Prof. of Physics. — Leipzig, '75-6; Berlin, '76-8; Göttingen, '78-9; Johns Hopkins, '79-80; Prof. Phys. and Astron., U. of Kansas, '83-7; Ed. *Physical Review*. — Experimental Physics.

Absent, 1894-95.

E. A. MERRITT,

Asst. Prof. of Physics.

Abs. measurements in electr. and magnet. 3, lab. work, 32.

Thermometry and calorimet. 3, lab., 32.

Adv. spectroscopy. 3, lab., 32.

G. S. MOLER,

A.B.; Asst. Prof. Physics.

Adv. photography, esp. its app. to research. 2, 32.

FREDERICK BEDELL,

Ph.D.; Asst. Prof. in Physics.

Theory alt. currents. 2, 20, Ja.-My.

Theory electric. and magnet. 2, 32.

F. J. ROGERS,

B.S.; Instr. Physics.

Thermodynamics. 2, 32.

C. P. MATTHEWS,

M.E.; Instr. in Physics.

Theory of dynamo and motor. 2, 20, Ja.-My.

J. S. SHEARER,

B.S.; Instr. in Physics.

Theory of light. 2, 32.

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JOHN TROWBRIDGE,

S.D.; Prof. of Physics and Dir. Jeff. Phys. Laboratory.

Spectrum anal. Research. 12, 31.

*Gen. treatment optical phenomena. 1, lab., 31.

*Electro-dynamics, magnetism, electro-magnetism. 2, lab., 31.

Electro-dynamics, with special reference to periodic currents of electricity. 9, 31, lab.

B. O. PEIRCE,

Ph.D., Leipzig, 1879; Hollis Prof. Math. and Nat. Philosophy. — Leipzig, '77-9; Berlin, '79-80.

Research in mathemat. physics.

Math. theory of electrostatics and electrokinematics.

*Electrostat., electrokinemat., electro-magnetism (part). 1, L 6-8, 31.

E. H. HALL,

Ph.D., Johns Hopkins, 1881; Asst. Prof. Physics. — Johns Hopkins, '77-81. — Effect of magnetic force on the equipotential lines of an elec. current ("Hall effect"); thermal conductiv. nickel and iron; cylinder condensat. in steam engines.

Research in electro-magnetism and heat conduction.

Math. theory magnetism.

Harvard—Continued.

*El. Thermodynamics. 2, 16, O.-Ja.

*Thermodynamic Potential. 2, 16, F.-Ju.

WALLACE C. SABINE,

A.M.; Instructor in Physics.

*Light and Heat. 2, 6-8, lab., 31.

JOHNS HOPKINS.

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H. A. ROWLAND,

Ph.D., hon., Johns Hopkins, 1880; Prof. Physics and Dir. Phys. Lab.—Asst. Prof. Rensselaer Polytech., '72-5.

Lectures on Elec. and Magnetism. 4, 30.

J. S. AMES,

Ph.D., Johns Hopkins, 1890; Assoc. Prof. of Physics.

Physical Seminary. 1, 30.

Lectures on Theoret. Mechanics. 2, 15, O.-Ja.

Lectures on Hydrodynamics. 2, 15, F.-My.

Original work in Physics is carried on in the laboratory under the direction of the instructors.

[Dr. Duncan]:

Applied Electricity. 3, 30.

[Mr. Hering]:

Electrical Measurements. 1, 30.

[Mr. Geer]:

Machine Design. 2, 15, O.-Ja.

Mechan. drawing. 6, 30, in 1st yr.; 3, 30, in 2d yr.

The Electrical Seminary and Laboratory work are directed by Prof. Rowland, Dr. Duncan, Messrs. Hering and Geer.

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LOUIS DUNCAN,

Assoc. Prof. Elec.; Ph.D., Johns Hopkins, 1885.

Applied Elec. 2, 30.

Sem. (with Prof. Rowland). 1, 30.

LELAND STANFORD, JR.

FERNANDO SANFORD,

M.S., Carthage College, 1882; Prof. of Physics, Univ. of Berlin, 1886-88; Prof. Physical Science, Lake Forest Univ., 1890-91.—Conductivity of Copper Wire in various Dielectrics, etc.

*Chemical Physics. 2, 32.

*General Physics. 3, 32.
Orig. Probs. in Laboratory.

ALBERT P. CARMAN,

D.Sc., Princeton, 1886.—Prof. Theoretical Physics, Univ. of Berlin, 1887-89; Prof. Physics and Electricity, Purdue Univ., 1889-92.

*Elec. and Magnetic Meas. 3, 32.

*Mathematical Physics. 2, 32.

*Periodic Currents. 2, 14.

MERRITT E. TAYLOR,

M.S., Northwestern Univ., 1884; Asst. Prof. of Physics, Berlin, Zürich, Johns Hopkins, 1886-89; Electrician, Incandescent Lamp Co., Chicago, 1889-92.

*Elec. and Magnetic Meas. 3, 32.

MICHIGAN.

HENRY S. CARHART,

LL.D.; Prof. of Physics and Dir. Phys. Lab.

*Dynamo-electric Machinery. 3, 17, O.-F.

*Alternate Current Transformer. 2, 17, O.-F.

Theory of Heat: Preston. 3, 17, O.-F.

*Electrical units and measurements. 2, L 3, 17, O.-F.

GEORGE W. PATTERSON,

A.M., S.B.; Asst. Prof. of Physics.

*Math. Electricity: Emtage. 3, 17, F.-Ju.

*Advanced Photometry. 2, 17, F.-Ju.
Electricity and magnetism: Mascart and Joubert. 2, 17, O.-F.

JOHN O. REED,

Ph.M.; Asst. Prof. of Physics.

Theory of light. 2, L 2, 17, F.-Ju.

KARL E. GUTHE,
Ph.D., Marburg.

*Adv. Lab. work in Elect. and Mag.
17, F.-Ju.

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FREDERICK S. JONES,

Yale, '84. — Two years of grad. study in Germany (Royal Polytechnic Institute and University of Berlin); Prof. of Physics, since '85.

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G. F. BARKER,

M.D., Alb. Med. Coll., 1863; Prof. of Physics, Prof. Physiol. Chem., Yale, '66-73; Ed. *Year. Franklin Inst.*, '73-5; *Asso. Ed. Am. Jour. Sci.*, since '77. — Text-books in Chem. and Physics and various papers on Physics, Chem. and Elec.

Theory and Practice of Spectroscopy.
2, 15.

Sound and Light. 2, 15.

Electricity and Magnetics. 2, 15.

Theory of Potentials. 1, 15.

Physical Investigations.

A. W. GOODSPEED,

Ph.D., Univ. of Penna., '90; Asst. Prof. Physics. — Harvard; U. of Penna.

Theoretical Dynamics. 2, 30.

Thermodynamics. 1, 15.

Absolute Physical Measurements. 6,
30 (with Asst. Prof. Goodspeed).

PRINCETON.

C. F. BRACKETT,

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Math. theory electric. and gen. electric. 8, 32.

Theory of electric. 4, 16.

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W. F. MAGIE,

Ph.D., Berlin, 1885; Prof. of Physics. — Princeton, '79-84; Berlin, '84-5; Princeton: Asst., '79-82; Instr. in Physics, '82-5;

Asst. Prof. Physics, '85-90. — Electrical discharge, atmospheric electric, surface tension of liquids, theory of temp.

*Theory of heat. 2, 16, F.-My.

*Theory electric (el.). 2, 16, O.-Ja.

Lab. practice. L, indef. 32.

Math. physics. L, indef. 32.

VANDERBILT.

JOHN DANIEL,

A.M., '84, Univ. of Ala.

*Electricity and Magnetism. 4, 16.

Electricity and Magnetism. 3, 32.

Experimental Electricity. 6, 32.

WESTERN RESERVE.

F. P. WHITMAN,

A.M., Brown Univ., 1877; Prof. Physics and Astronomy. — Johns Hopkins Univ., '79-80; Prof. of Physics, Rensselaer Polytechnic Inst., 1880-5; Adelbert Coll., 1885.

*Electrical Measurements. 1, 6, lab.,
S.-Ju.

WISCONSIN.

BENJAMIN W. SNOW,

Ph.D., Berlin; Professor of Physics.

Adv. course in spectroscopy and spectrophotometry. S.-Ju.

Direction of investigation.

LOUIS W. AUSTIN,

Ph.D., Strassburg; Instr. in Physics.

Intro. to the study of math. physics
2, 36.

JOHN E. DAVIES,

M.D., LL.D.; Prof. of Math. Physics.

Math. theory of sound. 3, 36.

Math. Physics (special problems).
S.-Ju.

YALE.

Sloane Phys. Lab., spec. devoted to invest. and research in Physics. Rooms for optical and photographic work, esp. in spectrum. Engine room: dynamos and apparatus for electric and magnetic work. Provision for gen. experimental work and research in Physics.

Yale—Continued.

J. W. GIBBS [see 16].

Electro-magnetic Theory of Light.
2, 32.

Dynamics and Thermodynamics.
1, 32.

A. W. WRIGHT,

Ph.D., Yale, 1861; Prof. Exper. Physics,
in charge Sloane Phys. Lab.—Formerly
Prof. Nat. Phil. and Chem., Williams Coll.
—Polarization and Spectrum of Zodiacal

light, comets, sun's corona; gases in me-
teorites; electric deposit. of metals; ozone.

*Lab. course in Physics (cl.). L 2, 32.
Lab. course in Physics (adv. and
research).

C. S. HASTINGS,

Ph.D., Yale, 1873; Prof. Physics.—For-
merly Assoc. Prof. Physics, Johns Hopkins.
—Refraction of light; objectives, esp. tele-
scopic; composit of the sun.

Detailed treatment of some dept. of
Physics with Lab.

19. CHEMISTRY.

[For Mineralogy, see under 21.]

BROWN.

JOHN HOWARD APPLETON,

A.M., Brown, 1869; Newport Rogers
Professor of Chemistry.—Instr. Chemistry,
Brown, '63-68; England, France, Germany,
'70-72; Mem. Adv. Council Am. Chem.
Soc.—Series Chem. Text-books: The
Young Chemist; Qual. Analysis; Quant.
Analysis; Chem. Philosophy; Beginners'
Handbook Chem.; Metals of Chem.; Car-
bon Compounds.

Quantitative Anal. 6 (12), 34.

Organic Chemistry. 6 (12), 34.

Assaying. 6 (12), 22, Ja.—Ju.

Medical Chemistry. 6 (12), 22, Ja.
—Ju.

Agric. Chem. 6 (12), 22, Ja.—Ju.

Scouring and Dyeing of Wool. 6,
(12), 10, A.—Ju.

BRYN MAWR.

*1 Fellowship of \$525, open to graduate stu-
dents in Chemistry.*

E. H. KEISER,

Ph.D., Johns Hopkins, 1884; Prof. of
Chemistry.—Johns Hopkins, '81-4; Frei-
burg, '84; Göttingen, '87; Asst. in Chem-
istry, Johns Hopkins, '84-5.—Atomic
weights, benzene deriv., analyt. chem.

Organic chem. (adv.). 1, 30.

Chem. seminary. 1, 30.

Journal meeting. 1, 30 (with Dr.
Kohler).

DR. KOHLER.

Physical chem. 1, through part of
year.

CALIFORNIA.

W. B. RISING,

Ph.D., Heidelberg; Prof. Chem.

E. O'NEILL,

Ph.B. Asst.; Prof. Organic and Phys. Chem.

Courses in Analytical, Inorganic,
Organic, and Technical Chem. and
Sanitary Examinations and food
Analyses.

E. W. HILGARD,

Ph.D., Heidelberg; LL.D., Mississippi,
Columbia, Michigan. Prof. Agricult. and
Agricult. Chem.

Chemistry and Physics of Soils.

CHICAGO.

J. U. NEF,

Ph.D., München, 1886; Prof. of Chemistry.
—München, '84-7; Prof. Chem., Purdue
Univ., '87-9; Asst. Prof. Chem. and acting
head of Chem. Dept., Clark, '89-92.—Organ.
chem.; tautomeric compds.; constitut. of
benzo-quinone, acetacetic ether, bivalent
carbon.

Analyt. chem. Lect., 2, 36, O.—Ju.

Organ. chem. 4, 30, O.—My.

Spec. chaps. in org. chem. 2, 6,
Au.—S.

Organ. preparations. L 10-20, 30,
O.—My.

Research in org. chem. L 30-40,
36, Au.—My.

Journal meetings. 2, 30, O.—Mr.

E. A. SCHNEIDER,

Ph.D., München, 1882; Asst. Prof. Analyt. Chem.—Chemist, U. S. Geol. Surv., '86-92.

Special Chapters of Inorganic Chemistry. 2, 12, Jul.-S.

Adv. inorg. work. L 10-20, 12, Jul.-S.

Research in inorg. chem. L 30-40, 48.

FELIX LENGFELD,

Ph.D., Johns Hopkins, 1888; instructor in Chem.—U. of Cal., '84-6; Johns Hopkins, '86-8; Zürich, '88-9; Liège, '89; München, '89-90; Prof. Chem., So. Dakota Sch. of Mines, '90-1; Instr. of Chem., U. of Cal., '91-2.—Relative stabil. of alk. bromides; addit. of hydrogen to naphthalene and quinoline derivs.; derivs. of nitrogen halogen comp.

Adv. inorg. chem. 2, 36, A.-Ju.

Adv. inorg. prep. L 10-20, 36, O.-Ju.

Theoret. chem. 2, 30, O.-My.

Physico-chem. methods. L 5, 12, Ja.-Mr.

Research; inorg. chem. L 30-40, 36, O.-Ju.

JULIUS STIEGLITZ,

Ph.D., Berlin; Instructor in Chem.—Berlin, '86-9; Göttingen, '88; Clark, '90.—Condensations of amidoximes; benzo quinone carboxylic acids; quantitative method for determining alkaloids in extracts; derivatives of nitrogen halid comp.

The carbohydrates and complex hydrocarbons. 2, 12, O.-D.

Adv. qualit. spect. anal. Lects. and lab., 3-5, 12, A.-Ju.

Org. nitrogen derivs. 2, 12, Ja.-Mr. Research; org. chem. L 30-40, 48.

RICHARD T. CURTISS,

Ph.D., Würzburg, 1892; Docent in Chem.—Student at the Collège de France, '92-93.

Gen. org. chem. 6, L 4, 12, Jul.-S.

Hist. of chem. 2, 24, Ja.-Ju.

Org. preparats. L 10-20, 12, Jul.-S.

The Aromatic Series. 2, 24, Ja.-Ju.

MASSUO IKUTA,

Tokio, '80-4; Berlin, '85; Ph.D.—Asst. in Chem., Erlangen, 1887; Asst. in Chem., Clark Univ., '91-2.

The Chemistry of Coal Tar Colors. 1, 24, O.-Mr.

COLUMBIA.

P. DE P. RICKETTS,

E.M. Ph.D.; Prof. of Analyt. Chem. and Assaying.

Spectroscopic Analyses. L 8, 30 (with Dr. Wells).

Quant. Anal. 4, L 15, 45 (1½ yr.) (with Mr. Bowen and Dr. Vulté).

Volumetric Methods of Quant. Anal. L 8, 30.

Revision of Constants. L 12, 30 (with Dr. Vulté).

Plant Analysis. L 12, 30 (with Dr. Vulté).

Electrolytic Analysis. L 12, 60 (with Dr. Wells).

C. E. COLBY,

C.E.; Adj. Prof. Org. Chem.

[Offered in '92-93.]

El. org. chem. 3, lab., 30 (with Mr. Ward).

Gen. org. chem. 6, L 15, 30.

Adv. org. chem. L 12, 30.

Research; Org. chem. 30.

J. S. C. WELLS,

Ph.D., Columbia, 1877; Instr. in Qualitative Anal.—New Methods of analysis.

Exam. of new methods of qualitative anal. L 10, 30.

Special chem. reacts. L 10, 30 (with Mr. Bowen).

Qual. Anal. 4, L 15, 30 (with Dr. Cushman).

F. G. WEICHMANN,

Ph.D., Columbia, 1882; Instr. in Chem. Philos. and Chem. Physics.—Columbia; Berlin; Co-ed. *Sch. of Mines Quart.*, '79-81.—Theoretical chem.

Chem. philos. (el.). 2, 30.

Chem. philos. (adv.). 4, 30.

H. T. VULTÉ,

Ph.D.; Tutor in Quant. Anal.

Inorganic Compounds. 1, L 6, A.-My. (with Mr. Ward).

Organic Compounds. 1, L 8, 30 (with Mr. Ward).

Columbia — Continued.

- C. E. PELLEN, E.M.; J. A. DEGHNÉE,
Ph.B.,
Demonstrators.
Physiological Chemistry. 2, L 2, 15
(given twice a year) (with Mr.
Johnson).

CORNELL.

*Meetings held weekly, attended by instrs. and
graduates for reading journal abstrs.*

- G. C. CALDWELL,
Ph.D.; Prof. Agricultural and Analyt. Chem.
Quantitative anal. (adv.) (with L. M.
Dennis).
Hist. of Chem. 2, 32.
Sanitary Chem. 2, 20.

W. R. ORNDORFF,

Ph.D., Johns Hopkins, 1887; Asst. Prof.
Gen. and Organ. Chem. — Instr. Chem.,
Cornell, '87-90. — Decomposition of certain
org. comp.; preparation certain aldehydes:
acetone: mol. wt. hydrog. peroxide and
benzoyl peroxide.

Org. chem. (el.). 3, L 3, 32.
Special chaps. in org. chem. 2, 32.
Adv. org. chem. lab. and research. 32.
Sem. in organic chem. 1, 32.

L. M. DENNIS,

B.S.; Associate Prof. Analyt. Chem. — Mich-
igan, München, Aachen, Dresden. — Analyt.
Chem.; gas analysis.

Adv. inorg. chem. (sem.). 1, 32.
Adv. gas anal., Lab. 8.
Spectroscop. chem. anal. and color-
imetry. 1, lab., 12.
Metallurgy. 2, 8, A.-My.

J. E. TREVOR,

Ph.D., Leipzig, 1892; Asst. Prof. Physical
Chem. — Solution of double salts, measure-
ment of small disassoc. grades. (Physical
chem.)

Theoretical chem. 3, 32.
Phys. chem. lab. and research. 3, 32.
Sem. in phys. chem. 1, 32.

E. M. CHAMOT,

B.S.
Toxicology. 1, 10.

HARVARD.

- J. P. COOKE,
LL.D.; Prof. of Chem. and Mineralogy,
and Dir. Chem. Lab.
[Crystallography and the physics of
Crystals. 3, 16, F.-Ju.]
Chemical Physics (research). 5, 31.
[Mineralogy (research).]

- C. L. JACKSON,
A.M.; Prof. of Chem.
Research: Aromatic compounds.

- H. B. HILL,
A.M.; Prof. of Chem.
Research: Organ. chem.
*The carbon compounds. 3, lab., 31.

- T. W. RICHARDS,
Ph.D.; Instr. in Chem.
*Quantitat. anal. (adv.). 3, lab., 31.
*History of Chemistry and Chemical
Philosophy. 1, 31.
Inorganic Chemistry, including Deter-
mination of Atomic Weights (re-
search).

JOHNS HOPKINS.

*Meetings for hearing reports on journal ar-
ticles held weekly. 15-20 lectures by adv.
students on special topics.*

IRA REMSEN,

Ph.D., Göttingen, 1870; Prof. of Chemistry
and Dir. Chem. Lab. — Prof. Chemistry,
Williams, '72-6; Ed. *Amer. Chem. Jour.*

Select topics in the chem. of com-
pounds of carbon. 2, O.-D.
Carbon compounds. 5, Ja.-My.
Special topics of research.

H. N. MORSE,

Ph.D., Göttingen, 1875; Prof. Analyt.
Chem. — Instr. Chem., Amherst, '75-6.

Analyt. methods. 1, 30.

W. W. RANDALL,

Ph.D., Johns Hopkins, 1890; Assoc. in
chem.

Physical chem. 2, O.-D.
Laboratory work under the direction
of Prof. Remsen and Morse.

LELAND STANFORD, JR.**JOHN M. STILLMAN,**

Ph.D., University of California, 1885; Prof. of Chemistry. — Strassburg and Würzburg, '75-6; Instructor, Univ. of Calif., '75-82; Chemist, Boston and American Sugar Refining Co., '82-92.

- *Industrial Chemistry. 2, 32.
- *Theories of Chem. 1, 14.
- Advanced Laboratory (with G. M. Richardson and L. R. Lenox).

GEORGE M. RICHARDSON,

Ph.D., Johns Hopkins, 1890; Assoc. Prof. of Chemistry. — Instructor, Lehigh Univ., '90-91.

- *History of Chemistry. 1, 18.

MICHIGAN.

Journal Club, in which all instructors take part. 2, 17, F.-Ju.

A. B. PRESCOTT,

M.D., Ph.D.; Prof. of Organic Chemistry. — General organic and analytical chemistry.

- Organic synthesis and ultimate analysis. Lab., 34.
- Analyt. and org. chem. Lab., 34.
- Investigations in org. chem. 34.

PAUL C. FREER,

Ph.D., München, 1887; Prof. of General Chemistry. — München, 83-87; Tufts Coll., Asst. in Chem., '87; Instr., '88; Lect. in Chem., Michigan, '89. — Organic Chem., esp. acetic ether and other ethers.

- Theoretical chem. of recent years. 2, L 10, 17, O.-F.
- Research. Lab., 34.

OTIS C. JOHNSON,

A.M.; Prof. of Applied Chemistry.

- *Qual. anal. chem. 2, L 10-20, 17, F.-Ju.
- *Invest. in inorgan. reactions and qualit. methods.

VICTOR C. VAUGHAN,

M.D., Ph.D.; Prof. of Hygiene and Physiol. Chem.

- Original research. 34.

F. G. NOVY,

M.D., Sc.D.; Junior Prof. Hygiene and Physiol. Chem.

- Advanced physiological chemistry. 34.

E. D. CAMPBELL,

B.S.; Junior Prof. Metallurgy and Metallurgical Chemistry.

- *Quant. anal. chem. 34.
- *Investigations in quant. methods. 34.

GEORGE O. HIGLEY,

M.S.; Instr. in General Chemistry.

- *The rarer chem. elem. 2, lab., 17, F.-Ju.
- Laborat. researches in selected topics. 34.

D. M. LICHTY,

M.S.; Instr. in General Chemistry.

- *Methods of determining molec. weights. 3, lab., 17, F.-Ju.

MINNESOTA.**GEORGE B. FRANKFORTER,**

Univ. of Nebraska, '86; M.A., '88; Lincoln (Neb.), one year; Ph.D., Royal Univ. of Berlin; Prof. of analytical chemistry in the Univ. of Neb.; Prof. of Chem. since Dec., 1893; Narcene and its constitutional structure; Beitrag zur Kenntniss des Narcenes; The Iodides of Narcene.

- Special Inorganic Preparations.
- Research work in Electro-chemistry.
- Research work in general Organic Chemistry.
- The Plant Alkaloids.
- Stereo-chemistry and the Optical Activity of Organic and Inorganic Compounds.
- Special research work in general Analytical Chemistry.
- Individuals are guided in laboratory investigations throughout the year.

PENNSYLVANIA.**E. F. SMITH,**

Ph.D., Göttingen, '76. — Prof. of Chemistry, Göttingen, '74-76; Prof. Chem., Wittenberg Coll., '83-88. — Investigation in inorganic, organic, and analytical chemistry; Translator of Richter's chemistry text-book.

Pennsylvania — Continued.

Advanced Inorganic Chemistry. 2, 30.
 Analytical Chemistry. 1, 30.
 Inorganic Preparations. 1, 15.

HERMANN FLECK,

Ph.D., Tübingen, '93; Instructor in Chemistry.

Organic Chemistry. 2, 30.
 Gas Analysis. 1, 15.

JULIUS OHLY,

Ph.D., Göttingen, '93; Instructor in Chemistry.

History of Development of Chemical Theory. 1, 30.

ROBERT H. BRADBURY,

Ph.D., Univ. of Penna., '94.

Physical Chemistry. 1, 15.

PRINCETON.**H. B. CORNWALL,**

Ph.D., Columbia, 1887; Prof. Applied Chem. and Mineralogy.

Adv. work in quant. chem. anal.; inorg. and org. 1, lab., 32.

*Inorg. qual. anal. 2, L 5, 16, F.-My.

*Inorg. quant. anal. 1, lab., 16, F.-My.

Other (technical) courses.

L. W. MCCAY,

D.Sc.; Prof. of Chemistry.

Theoret. and org. chem. 2, 16, O.-Ja.

VANDERBILT.**WILLIAM L. DUDLEY,**

M.D.; Professor of Chemistry.

*Chemical Technology. 3, 32.

*Quantitative Analysis. 3, 32.

*Metallurgy. 2, 32.

*Laboratory Work. 3, 32.
 Research Course.

J. T. MCGILL,

Ph.D., Vanderbilt; Adjunct Professor of Chemistry.

*Laboratory Work in Organic Chemistry. 3, 32.

*Special Chapters in Organic Chemistry. Lectures. 2, 32.

*Advanced Organic Chemistry. 3, 32.
 Research Course in Organic Chemistry.

WESTERN RESERVE.**EDWARD W. MORLEY,**

Ph.D., LL.D.; Prof. Chemistry.—Prof. Chemistry, West. Res. College and Adelbert College, 1869.

*Organic Chemistry. 2 + 1, lab., S.-Ju.

Quantitative Analysis. 3, lab., S.-Ju.

WISCONSIN.**W. W. DANIELLS,**

M.S.; Professor of Chemistry; State Analyst.

Adv. Inorganic Chemistry. S.-Ju.

Organic Chemistry. S.-Ju.

Analytical and Applied Chemistry. S.-Ju.

YALE.**SAMUEL W. JOHNSON,**

A.M., hon., Yale; Prof. Theoret. and Agri. Chem.—Leipzig, '53-4; München, '54-5; Owens Coll., Manchester, England, '55; Dir. Conn. Agri. Exp. Station.—Composition, structure and nutrition of Cultivated Plants.

*Chem. Physiology of vegetation. 2, 12, O.-D.

*Agricultural chem. 2, 20, Ja.-Ju.

F. A. GOOCH,

Ph.D., Harvard, 1877; Prof. of Chem.—Harvard, '72-5; Wien, '75-6; Harvard, '76-7; Asst. Harvard, '72-5; Expert sp. agt. U. S. 10th census, '79-81; chem., Northern Transcont. Survey, '81-84; U. S. Geol. Survey, '84-86. — Analyt. Apparatus, methods and results; separation and determination of elements.

*Exper. Inorgan. Chem. 3, exc., 32.

*Exper. Organ. Chem. 3, exc., 32.

*Qual. Anal. 3, exc., 32.

*Quant. Chem. Anal. (el.). 3, exc., 32.

Quant. Chem. Anal. (adv.). 3, exc., 32.

Theoret. Chem. 1, 32.

Orig. Work and Research.

R. H. CHITTENDEN [see 20].

H. L. WELLS,

Ph.B., Yale, 1877; Asst. Prof. Anal. Chem.—Yale, 1877-80; München, '89; Chemist of Conn. Agri. Exp. Station., 2 yrs.—Minerals; Polyhalides; Double-salts; Analyt. Methods.

Analyt. Chem. Lab.

*Qual. Anal. (cl.). O.-D.

*Quant. Anal. O.-Ju.

Quant. Anal. (adv.). O.-Ju.

*Metallurgy and Assaying. Easter-Ju.

*Tech. Gas Analysis. Easter-Ju.

Invest. in Inorgan. Chem. O.-Ju.

A. J. WAKEMAN,

Ph.B.; Instr. Anal. Chem.

*Adv. Descriptive and Theoret. Chem. 3, 32.

*Physical Methods used in connection with Chem. O.-Ju.

WILLIAM T. H. HOWE,

Ph.B., Yale, 1893; Lab. Asst. in Chem.

*Organ. Chem., Paraffin Series. 2, 32.

*Organ. Chem., Aromatic Series. 2, 12, O.-D.

*Organ. Preparations. 10, Ja.-Easter.

*Theoret. Organ. Chem. 3, 10, Ja.-Easter.

Adv. Organ. Chem. 32.

20. BIOLOGY.

[Including Zoölogy, Botany, Physiology, and Palæontology (in part). See also 21.]

BROWN.

ALPHEUS SPRING PACKARD,

M.D., Ph.D.; Prof. of Zoölogy and Geology.—Libr. Boston Soc. Nat. Hist., '65; State Entomologist, Mass., '71-73; Lecturer, Mass. Agr. Coll., '69-77; Maine Agr. Coll., '71; Bowdoin, '73-76; w. U. S. Geol. Surv., '75-77; w. U. S. Fish Com., '71-74.—Many scientific works, chiefly Zoölogy and Geology.

Zoölogy. 3, 12, Ja.-Mr.

HERMON CAREY BUMPUS,

Ph.D., Clark, 1890; Prof. of Comparative Anatomy.—B.Ph., Brown, '84; Instr. Biology, Brown, '84-85; Prof. Biology, Olivet Coll., '85-88; Fellow in Morphology, Clark Univ., '88-89; Assoc. Prof. Zoölogy, Brown, '89-90; Germany, '91-94; Asst. Dir. Marine Biol. Lab., Woods Holl, Mass., '94.

Invertab. Anatomy. 3, 10, A.-Ju.

Comparative Anat. of Vertebrates. 3, 24, S.-Mr.

GEORGE WILTON FIELD,

Ph.D., Johns Hopkins, '92; Assoc. Prof. of Cellular Biology.—A.M., Brown, '90; Asst. in Biology, Johns Hopkins, '91-92; Naples, It., Zoölog. Station, '92-93.

Cellular Biology. 3, 10, A.-Ju.

Bacteriology. 1, 34.

General Biology. 3, 24, S.-Mr.

WILLIAM WHITMAN BAILEY,

A.M., Brown, '93; Prof. of Natural History (Botany).—Asst. in Chemistry, Mass. Inst. Techn., '66; Botanist, U. S. Geol. Exped., '67-68; Instr. Botany, Brown, '77-81; Fellow Am. Assoc. Adv. Sci.

Histology and Embryology of Phanerogams.

WINTHROP J. V. OSTERHOUT,

A.M., Brown, 1894; Instr. in Botany.

Structure and Devel. of Cryptogams. 3, 24, S.-Mr.

BRYN MAWR.

1 Fellowship of \$525.

T. H. MOREAN,

Ph.D., Johns Hopkins, 1890; Assoc. Prof. Biology.—Embryology of Pycnogonids; develop. of *Balanoglossus*; develop. of frog, metamerism.

Biology (adv.). fort.

Theories of Metamerism (lect.).

Ancestry of the Chordata (lect.).

*General Zoölogy. 1, 30.

*Embryology. 1, 30.

Journal Club. fort. (with Dr. Warren).

Seminary. fort. (with Dr. Warren).

Bryn Mawr — Continued.

J. W. WARREN,

M.D., Bonn, 1880; Assoc. Prof. Physiology. — Berlin, '71-2; Leipzig, '72-3; Bonn, '73-9; Asst. and Instr. in Physiol., Harvard, '81-91; Lecturer, Med. Dept., U. of City of N. Y., '85-6; Lect. in Physiol., Mich., '89.

*Structure and func. of central nervous system. 1, 30.

*Physiology (adv.). 1, 30.

CALIFORNIA.

E. L. GREENE,

Ph.B., Albion; Prof. Bot.

Economic Botany.

The Phanerogamic Natural Orders.

Hist. of Bot.

Medical Botany.

Advanced Systematic Botany.

M. A. HOWE,

Ph.B., Vermont; Inst. Crypt. Bot.

Syst. Crit. Studies in Crypt. Plants.

Hist. and Comp. Studies in the Higher Crypt.

Vegetable Histology.

CHICAGO.

C. O. WHITMAN,

Ph.D., Leipzig, 1878; Head Prof. of Zoölogy. — Leipzig, '75-78; Prof. Zoölogy, Imp. Univ., Japan, '80-81; Asst. in Zoö., Harvard, '83-85; Dir. Allis Lake Lab., '86-89; Dir. Marine Biol. Lab., Woods Holl, since '88; Prof. Zoö., Clark, '89-92; Ed. *Your. of Morphol.*; Pres. Am. Soc. Morphol. — Embryol. and anat., esp. leeches and teleosts; cytology; sense organs; methods morpholog. research; biol. instruction.

Embryol., higher invertebs. 1, L 15, 24, O.—Mr.

Embryol., tectonics verteb. emb. 1, L 15, 12, A.—Ju.

Sem. historical topics. fort. 24, O.—Mr.

Marine Biol. Lab., Woods Holl. Jul.—S.

H. H. DONALDSON,

Ph.D., Johns Hopkins, 1885; Prof. of Neurology. — Johns Hopkins: Instr. Biol., '83-84; Assoc. in Psychol., '87-88; Asst. Prof. Neurology, Clark, '89-92. — Temperature sense, brain of Laura Bridgman.

The study of neurological problems. (Throughout year.)

Architect. central nerv. syst. 4, 12, O.—D.

Anat. of the spec. sense organs. 4, 6, Ja.—F.

Physical characters of brain as related to intelligence. 4, 6, F.—Mr.

Doctrine of localiz. of funct. in cerebral cortex. 4, 12, A.—Ju.

Dev. central nerv. syst. 4, 12, Jul.—S. Seminary. 2, 48.

ADOLPH MEYER,

M.D., Zürich, 1892; Honorary Fellow, University of Chicago, 1892-93.

Introduction to the compar. anat. of cen. nerve system. 2, 12, A.—Ju.

ALBERT C. EYCLESHYMER,

S.B., University of Michigan, 1891; Asst. in Anatomy. — Fellow in Biology, Princeton, 1881; Fellow in Morphology, Clark University, 1891-92; Fellow in the University of Chicago, 1892-93.

Mammalian Anatomy. 4, 6, O.—N. Methods of Preparation of Animal

Tissues. 4, 6, N.—D.

Elements of Histology. 4, 6, Ja.—F. Methods of Preparation of Animal

Tissues. 4, 6, F.—Mr.

Comparative Anatomy. 4, 12, Ja.—Mr.

Comparative Histology. 4, 12, A.—Ju.

Methods of Preparation of Animal Tissues. 4, 6, Jul.—Au.

Elements of Histology. 4, 6, Au.—S.

G. BAUR,

Ph.D., München, 1882; Asst. Prof. Compar. Osteology and Palæontol. — München, '79-81; Leipzig, '81-82; Asst. Palæontol., Yale, '86-90; Docent in Comp. Osteol. and Palæontol., Clark, '90-92. — Verteb. osteol. and palæontol.; gen. zoö.

Outlines verteb. zoö. and palæontol. (el.). 2, 12, O.—D.

Comp. osteol. and phylog. of verteb. L 2, 2, 24, Ja.—Ju.

Sem. in Phylogeny. 2, 36, O.—Ju.

Research in osteol. living and extinct verteb. 26, 36, O.—Ju.

Palæontolog. field work. Jul.—S.

JACQUES LOEB,

M.D., Strassburg, 1884; Asst. Prof. of Physiology. — Asst. Physiol., Würzburg, '86-88; Asst. Physiol., Strassburg; Assoc. in Biol., Bryn Mawr, '91-92.

Orig. invest. in physiol. Lab., daily, 48.

Advanced Physiology. 4-8, 24, O.—Mr.

Advanced Physiology. 4-8, 12, Jul.—S.

Physiol. sense org. and periph. nerv. syst. 4, L 4, 12, O.—D.

Physiol. circulation, respir., animal heat. 4, L 4, 12, Ja.—Mr.

Gen. physiol. nerves and muscles. 1, L 4, 12, Jul.—S.

Gen. Phys. of Plants and Animals. 12, Jul.—S.

W. M. WHEELER,

Ph.D., Clark, 1892; Instr. in Embryology. — Asst. in Morphol., Clark, '90-92. — Insects: Embryology, biology, fauna.

Vertebrate embryol. 3, L 7, 36, O.—Ju.

E. O. JORDAN,

Ph.D., Clark, 1892; Instructor in Zoölogy. — Clark, '90-92; Lect. on Biol., Mass. Inst. Tech., '89-90.

Special Bacteriology. 8, 36, O.—Ju.

General Biology. 4, 24, O.—Mr.

General Bacteriology. 4, 12, A.—Ju.

General Biology. 4, 12, Jul.—S.

S. WATASE,

Ph.D., Johns Hopkins, 1890; Instructor in Cellular Biol. — Johns Hopkins, '87-90; Asst. and Lect. in Zoöl., Clark, '90-92; Instr. at Marine Biol. Lab., Woods Holl. — Fish-fins; compound eyes; cleavage, esp. in Cephalopods; spermatogenesis.

Anat. and Physiology of cell. 4, 36, O.—Ju.

D. J. LINGLE,

Ph.D., Johns Hopkins, 1892; Instructor in Physiology. — Johns Hopkins, '87-89; '90-92; — Asst. Prof. Biol., Tulane. — Vaso-motor nerves of the heart; physiol. of Ascedian heart.

Gen. Lab. in Physiology. 9, 12, A.—Ju.

Special Phys. of the Peripheral Nervous System. 2, L 2, 12, Jul.—S.

Physiol. of digestion, secretion, metabolism. 2, L 6, 12, Ja.—Mr.

CLARK.

Lab. open daily from 8-6. Special attention given to individual work. Journal Club, 1, 32. 2 Fellowships of \$600; 2 of \$400; 2 Scholarships of \$200; 2 of \$100.

C. F. HODGE,

Ph.D., Johns Hopkins, 1889; Fellow and Asst. in Neurol., Clark, '90-91; Instr. in Biol., Univ. Wis., 1892; Asst. Prof. Physiol. and Neurol.

Gen. Biol. (adv.). 1, O.—Ja., lab.

Comp. study of nervous syst. and sense organs. 1, 32.

Physiol. of Nutrition. 1, 32, lab.

Physiol. of Reproduction.

Cerebral Localization. 6 lects., My. and Ju.

Embryology of Human brain and sense organs. 6 lects., A.

Muscle and nerve physiol.

Pract. histol. of nerve. syst. Lab.

COLUMBIA.

Herbarium contains nearly 500,000 spec., esp. from Eng. and Scot., U. S. and Switz.; mosses.

J. G. CURTIS,

M.D.; Prof. of Physiology.

[With F. S. Lee:]

Comp. human and vert. physiol. 4-6, 30.

Lab. work in physical physiol. (research).

N. L. BRITTON,

Ph.D., Columbia, 1881; Prof. of Botany. — Columbia: Instr. in Botany, '87-9; Adj. Prof. Botany, '89-91; Ed. *Bull. and Mem. Torrey Botanical Club*; Ed. *Trans. N.Y. Acad. Sci.* — Flora of New Jersey, North Am., Bolivia, Paraguay; geograph. distr. plants.

Nat. orders flowering plants. 1, L 4, 30.

Cryptogamic botany. 1, L 4, 30 (with Dr. Curtis).

Cryptogamic botany (adv.). 1, L 4, 30 (with Dr. Curtis).

Research in systematic botany.

Columbia—Continued.

H. F. OSBORN,

Sc.D.; DaCosta Prof. of Biology.

Morphol. of mammals. 6, 30.

Comp. zool. 6, 30 (with E. B. Wilson).

*Comp. neurology. 3, 30.

[Vest. Organogeny, 1895-6.]

E. B. WILSON,

Ph.D., Johns Hopkins, 1882; Adj. Prof. Invertebrate Morphology.—Yale, '78-9; Johns Hopkins, '79-82; Cambridge (Eng.), Leipzig, '82-3; München, '91-2; Asst. Zoology, Yale, '78-9; Asst. Biol., Johns Hopkins, '81-2; Lect. Biol., Williams, '83-4; Lect., Mass. Inst. Technol., '84-5; Prof. Biol., '85-91.—Embryol. invertebrates, cytology.

Cellular Biol. 6, F.—My.

Compar. embryol. 6, O.—Ja.

Special Embryol. 6, F.—My.

[See also under F. H. Osborn.]

F. S. LEE,

Ph.D., Johns Hopkins, 1885; Demonstr. in Physiology.—Johns Hopkins, '81-5; Leipzig, '85-6; Assoc. in Physiol. and Histol., Bryn Mawr, '87-91.—Action of salts, etc., upon arteries, electric phenomena of contracting muscle, equilibrium-sense.

*General physiology.

[See also under J. G. Curtis.]

C. C. CURTIS,

A.M., Columbia, 1892; Ph.D., Syracuse, '93; Asst. in Botany.

Adv. vegetable anatomy. L 4, 30.

BASHFORD DEAN,

Ph.D., Columbia, 1890; Instr. in Biology.—Columbia, '88-90; München, '92; Asst. U. S. Fish Com.—Insectiv. plants, biol. of oyster, fossil fishes, fish fins.

Morphol. fishes, esp. palæozoic. 6, 30.

G. W. CALKINS,

B.S.; Tutor in Biol.

Special Morphol. 1, F.—My.

Adv. Biol. L 12, 30.

G. S. HUNTINGTON,

Ph.D.; Prof. of Anat. Animal Morph.

Comp. Morph. of Carpus.

Comp. Morph. of Respiratory Apparatus.

Comp. Morph. of Nervous Syst.

Comp. Myology.

Comp. Morph. of Auditory App.

Comp. Morph. of Urinogenital Syst.

Cranial Topog.

T. M. PRUDDEN,

M.D.; Prof. of Pathology.

T. M. CHEESMAN,

M.D.; Instructor in Bacteriology.

Methods of study, measurements, etc., of Bacteria.

CORNELL.

Herbar. contains 15,000 sp.; Insectary of Agric. Exp. Stat. affords facilities for investig. in life history of insects. Museum with 3,000 human and comp. anat. specs., and 1,500 histol. and embryolog. specs.

BURT G. WILDER,

M.D., Harvard, 1866; Prof. Physiology, Comp. Anatomy and Zoology.—Harvard (Jeffries Wyman).—Pres. Am. Neurolog. Ass.—Anat. nomenclature; gross. anat. of brain, human and comp.; anat. of cat; ganoid fishes; spiders.

Neurology. 2, 8, A.—My.

Comparative anatomy. Lab. 6, 32.

A. N. PRENTISS,

M.S.; Prof. Botany and Arboriculture.—Mich. Agric. Coll., '63-5; Prof. Bot. and Horticult., Mich. Agric. Coll., '64-8.—Mode of distrib. of plants; destruct. of insects by fungi.

Exotics.

Research in phanerog. and plant physiol.

J. H. COMSROCK,

B.S.; Prof. of Entomology, and Gen. Invertebrate Zoology.—Yale, '74-5; Leipzig, '88-9; Formerly U. S. Entomologist; also Prof. Entomol., Leland Stanford, Jr., Univ.—Econom. Entomology; Systemat. Entomol.

Lab. work in insect anat., life hist., and classific. L 25, 20, O.—D.; A.—My.

Entomolog. sem. 2, 8, A.—My.

Summer course in entomol. 3 lects., field and lab. work. 10, Ju.—S.

S. H. GAGE,

B.S.; Assoc. Prof. Physiology.—Cornell, '77; Göttingen, '80; Instr. Asst. Prof. and Assoc. Prof., Cornell, since '78.—Anat., histol., physiol., microscopy.

Anatom. methods and gross anat. 3, 12, O.-D.

Microscope and micros. meths. 3, 12, Ja.—Mr.

Meths. and el. embryol. 4, 8, A.—My.

Vertebrate zool. lab. daily. 32.

Vert. histol. lab. daily. 32.

G. F. ATKINSON,

Ph.B.; Assoc. Prof. Botany.

*Fungi. 2, lab., 8, A.—My.

Research in cryptogams.

W. W. ROWLEE,

B.L.; D.Sc.; Asst. Prof. Botany.

Herbar. work on Phanerogams. 1, lab., 8, A.—My.

Histol. of plants. 1, lab., 12, O.—D.

P. A. FISH,

D.Sc.; Cornell, 1894.

Histology of nervous system. 3, 32.

HARVARD.

Museum Compar. Zoölogy, founded by Louis Agassiz, 1859 (Alexander Agassiz, curator), has collections, under the charge of museum assts., and available for scientific study. Lib. of over 23,000 vols., and half as many pamphlets on Zoölogy and Palæontology. Humboldt Fund maintains one or more students at Museum, Newport Marine Lab., or Woods Holl, U.S. F.C., Stat. Investigations are published in the Bull. Mus. Comp. Zool. Botanic garden of 7 acres offers facilities for investig. Herbarium of over 200,000 species, incl. types of Synoptical Flora of N. A. Bot. lib. at Herbar. of over 9,000 vols. Bot. Mus., incl. Blaschka glass models. Extensive cryptogamic herb. Zoölogical and Botanical Clubs meet fortnightly. Virginia Barrett Gibbs Schol. of \$250, open to students in Zool., also a table at Naples Zool. Stat.

GEORGE L. GOODALE,

M.D., Harvard, 1863, LL.D.; Fisher Prof. Natural History.—Harvard, Tübingen; Formerly Pres. Am. Naturalists, Am. Soc. Adv. Sci., Bost. Soc. N. H.; Assoc. Ed. *Am. Four. Sci. and Arts.*—Physiol. and Econom. botany.

Research in systematic phanerog. botany; veg. phys.; and econ. bot.

*Phanerog. botany. 2, lab., 31.

Botany (second course). 2, 3, lab., 31.

W. G. FARLOW,

M.D.; Prof. Cryptogamic Botany.

Research in struct. and devel. cryptogams (with R. Thaxter).

E. L. MARK,

Ph.D., Leipzig, 1876; Hersey Prof. Anatomy.—Leipzig, '73-76; Jena, '76; Instr. Math., U. of Mich., '71-2; Harvard: Instr. Zool., '77-83; Asst. Prof., '83-86; Ed. Contrib. from Zool. Lab. Mus. Comp. Zool. at Harvard Coll. since '83.—Anat. and histol. of Coccidæ and Phylloxera; Maturation, fecundation and cleavage in Limax; Simple eyes in Arthrop.; Lepidosteus; Turbellaria.

Anatomy and Development of Animals (research).

*Microscop. anat. 3, lab., 16, O.—Ja.

*Embryol. of Verteb. 3, lab., 15, F.—My.

ROLAND THAXTER,

Ph.D., Harvard, 1888; Asst. Prof. Cryptogamic Botany.—Mycology: morphological and systemat.; econom. mycol.

Cryptogam. bot. 3, lab., 15, F.—My.

[See also under W. G. Farlow.]

Morphology of Plants. 3, 16, O.—Ja.

G. H. PARKER,

Ph.D., Harvard, 1891; Instr. Zoölogy.—Harvard, '87-91; Leipzig, '91-2; Freiburg '92-3; Naples; Harvard: Asst., '86-88; Instr. Zool., '88-91; Biologist, Mass. State Bd. of Health, '88-90.—Compound eyes in Arthropods; animals of drinking water.

*Comp. anat. vertebr. 3, lab., 31.

Nervous System and its Terminal Organs. 3, 16, O.—Ja.

C. B. DAVENPORT,

Ph.D., Harvard, 1892; Inst. Zoölogy.—Harvard, '88-92.—Non-sex. reprod., esp. in Bryozoa; Urnatella.

*Experimental Morphol. 2, 31.

(Lectures, laboratory work, and a thesis.)

D. D. SLADE,

M.D.; Lect. on Comp. Osteol.

Comp. osteol. (research).

JOHNS HOPKINS.

Marine Lab. in Zoöl. is open during part of year. Students have access to Capt. J. D. Smith's private herbar., 78,000 sheets, esp. flora U. S. and Am. tropics; also to the Schimper coll. Europ. phaner., and Fritsger coll. mosses and others. Journal Club meets weekly. The income of the Adam T. Bruce Fell. of \$10,000 is yearly awarded to a student in Zoöl.

W. K. BROOKS,

Ph.D., Harvard, 1875; Prof. Animal Morphol. and Dir. Chesapeake Zoöl. Lab. Assoc. ed. *Studies from the Biolog. Lab.*

Principles of Zoöl. 3, O.-D.

Lectures in adv. zoöl. by instructors and fellows. 1, Ja.-Mr.

Marine Zoöl. 1, A.-Ju.

Zoöl. Seminary. 1, O.-Mr.

Readings in Zoöl., weekly, through winter.

W. H. HOWELL,

Ph.D., Johns Hopkins, 1884; Prof. of Physiology; M.D.—Johns Hopkins; Asst., Associate, Assoc. Prof., '84-'89; Lect., Michigan, '89-'90; Prof. Physiol. and Histol., Mich., '90-'92; Assoc. Prof. Physiol., Harvard, '92-'93.

Animal physiology. 4, 30, lab. work.

Physiological seminary. 1, 15, O.-Ja.

Lectures in adv. physiology by instructors and students. 1, 15, F.-My.

Adv. lab. work in Physiology.

[Dr. Lotsy].

Physiolog. or morphological botany.

LELAND STANFORD, JR.

CHARLES H. GILBERT,

Ph.D., Indiana Univ., 1883; Prof. of Zoöl. og.—Prof. of Zoöl. og., Indiana Univ., 1882-'91; Assistant to U. S. Fish Commission, 1880-'91.

Adv. Ichthyology. 3, 32.

DOUGLAS H. CAMPBELL,

Ph.D., Univ. of Michigan, 1886; Prof. of Botany.—Bonn, Tübingen, Berlin, 1886-'88; Prof. of Botany, Indiana Univ., 1888-'91.

*Histological Methods. 2, 32.

Adv. work.

WILLIAM R. DUDLEY,

M.S., Cornell, 1876; Prof. of Botany.—Penikese, 1876; Strassburg, Berlin, 1887-'88; Asst. Prof. Botany, Cornell Univ., 1876-'92.

Biol. of Spermatophyta and Fungi (adv.). 5, 32.

OLIVER P. JENKINS,

Ph.D., Indiana Univ., 1886; Prof. of Physiology.—Prof. of Biology, De Pauw Univ. 1886-'91.

*Animal Physiology. 3, 32.

*Nervous System (with C. W. Greene). 3, 32.

Seminary. 1, 32.

Journal Club. 1, 32.

Nervous System and Sense Organs (adv.).

JOHN H. COMSTOCK,

B.S., Cornell, 1874; Prof. of Entomology.—Yale, 1874-'75; Leipzig, 1888-'89; Formerly U. S. Entomologist; also Prof. Entomol., Cornell Univ.—Econ. Entomology; Systematic Entomol.

Adv. Laboratory (with V. L. Kellogg).

3, 32.

*Morphol and Clas. of Coccidæ. 3, 12.

Seminary.

VERNON L. KELLOGG,

M.S., Univ. of Kansas, 1892; Assoc. Prof. of Entomology.

Adv. Laboratory. 3, 32.

GEORGE C. PRICE,

B.S., De Pauw Univ., 1890; Asst. Prof. of Zoöl. og.—Johns Hopkins, 1890-'92.

*Adv. Embryology. 2, 32.

CHARLES W. GREEN,

A.M., Stanford, 1893; Instructor in Physiology.

Circulation of Blood (adv.). 2, 32.

HOMER J. HEATH,

*Histology.

MICHIGAN.

J. B. STEERE,

Ph.D.; Prof. of Zoöl. og.

- *Systematic study of Vertebrates.
- *Special Study of Invertebrate groups.
- *Development of species and theory of classification.

W. P. LOMBARD,

M.D., Harvard, '81; Prof. of Physiology and Histology.—Harvard, '78-81; Leipzig, '82-5; Asst. in Physiol., Coll. Phys. and Surg., N. Y., '88; Asst. Prof. Physiol., Clark, '89-92.

- *Physiology. 5, 34.
- *Physiology; laboratory course. 1, 17, O.-F. or F.-Ju.
- Physiological experimentation. 1, 17.
- Physiological research. 34.

G. C. HUBER,

M.D., 1888; Asst. Prof. of Histology.

Microscopic anat. of brain and special sense organs. 5, 17, O.-F. or F.-Ju.

F. C. NEWCOMBE,

Ph.D., Leipzig, 1894; Asst. Prof. of Botany.—Michigan: Instr. in Botany, '90-92.—Spore dissemination of *equisetum*; effect of mechanical resistance on the growth of plant tissues; eff. of mech. resist. on the development and life-period of cells.

- *Vegetable histology. 5, 17, O.-F.
- *Comp. anat. and physiol. of phanerogams. 5, 17, F.-Ju.

L. N. JOHNSON,

A.M.; Instr. in Botany.

- *Cryptogamic botany. 5, 34.

DEAN C. WORCESTER,

A.B.; Asst. Prof. of Animal Morphology.

Current lit. of animal morphol. 1, 34.

Original work in invertebrate morphol.; vert. comp. anat. embryol. and histol. 34.

- *Invertebrate morphol. 3, lab., 34.

C. A. KOFOID,

A.M.; Instr. in Animal Morphology.

- *Comp. embryol. and anat. of vertebrates. 5, lab., 34.
- *The animal egg. 1, lab., 17, F.-Ju.

W. H. LEWIS,

B.S.; Instr. in Animal Morphology.

- *Mammalian anat. 5, lab., 34.

MINNESOTA.

HENRY FRANCIS NACHTRIEB,

Univ. of Minn., 1882.—Fellow in dept. of Biology and asst. in Biol. Lab., Johns Hopkins, '82-84; Prof. of Animal Biology and Histology, Univ. of Minn., since 1886; State Zoölogist of the Geol. and Nat. Hist. Survey; Reports on the Zoölogical survey of the State.

Research: Any line of original investigation in

1. Invertebrate Embryology and Morphology.
2. Vertebrate Embryology and Morphology.

Advanced Studies: Corroborative work in any branch of Animal Embryology and Morphology.

Under certain conditions some undergraduate work may be pursued by those who have not completed the work as undergraduates.

Individual laboratory work directed throughout the year.

CONWAY MACMILLAN,

Univ. of Neb., '85.—Asst. Geologist of the U. of Neb., '85-86; M.A., '86; Biological Laboratory, Johns Hopkins, '86-87; instr. in Botany, U. of M., '87; grad. student, Harvard., '89; asst. prof. of Botany, '90; State Botanist of the Geol. and Nat. Hist. Survey; The Metaspermæ of the Minnesota Valley; several other reports on the Botanical survey of the State; Editor of the Minnesota Botanical Studies; Editor-in-chief of the *Quarterly Bulletin*.

Advanced Courses offered to undergraduates, in this department, are open also to graduate students.

Comparative Gametophytic Anatomy and Embryology; laboratory and reference work. Open to those who have completed six terms of botanical work. First term.

Comparative Sporophytic Anatomy and Embryology; laboratory and reference work. Open to those who have completed the work of the course as above. Second and third terms.

Phytodynamics and Oecology; lectures and reference work. Open to those who have completed five terms of botanical work. First term.

Minnesota — Continued.

Phytocytology, Structural and Dynamic; laboratory and reference work. Open to those who have completed seven terms of botanical work. Second and third terms.

Experimental Embryology Organogeny; laboratory and reference work. Open to a limited number who may present the requisite evidence of fitness for original research. Throughout the year.

Special research work in some selected line. Open to all graduate students whose preparation may be deemed sufficient. Throughout the year.

PENNSYLVANIA.

Biological Laboratory and Wistar Institute of Anatomy and Biology.

HARRISON ALLEN,

M.D.; Prof. Comp. Anat. and Zoölogy.— Human Anatomy and Comp. Anat. of Animals.

The Mechanism of Locomotion. 2, 30.

Mammalian Neurology and Craniology. 2, 30.

J. T. ROTHROCK,

M.D.; Prof. Botany.— Numerous Articles on Botany.

Systematic Botany; Economic Botany; Medical Botany. At least, 15, 30.

W. P. WILSON,

Sc.D.; Prof. of Botany.

Plant Histology:

Laboratory Work, with Instruction. 6, 15.

Plant Physiology:

Laboratory Work, with Instruction. 6, 15.

J. A. RYDER,

Ph.D., hon., U. of Penna.; Prof. Comp. Embryology.— Spec. Asst. U. S. Fish Commission, '80-6.— About 200 papers on Morphol. and Physiol.

Comparative Histology; supervision and laboratory work. 12, 15, O.-F.

Comparative Embryology; supervision and laboratory work. 12, 15, F.-J.

HORACE JAYNE,

M.D., U. of Penna, 1882; Prof. Vertebrate Morphology.— Jena, Leipzig, '82-3; Johns Hopkins, '83-4.— Abnormalities in N. A. Coleoptera; N. A. Dermestidæ.

The Osteology of the Mammalia. 4, 30.

J. M. MACFARLANE,

Sc.D., Edinburgh, '83; Prof. of Botany.— Edinburgh Univ.; Asst. in Botany, '79-87; Asst. Prof., '87-91; Prof. of Botany, Roy. Veter. Coll. and St. George's Coll., Edinburgh, '85-90.— Cell Hist.; botanical subjects; Hist.: of Dionææ.

Comparative Morphology of the leading Natural Orders of Plants. 3, 30.

Laboratory Work on the above. 9, 30.

PRINCETON.

1 fellowship of \$400 and 1 fellowship giving free use of table at U. S. F. C. station, Woods Holl.

The following subjects of instruction are arranged for:—

GEORGE MACLOSKIE,

LL.D., D.Sc.; Prof. of Biology.

Anat. and embryol. of higher invertebr.; vegetable morphol. and histol.

H. B. CORNWALL [see 19].

Physiol. chem.

WILLIAM LIBBEY, JR. [see 21].

The microscope and microscopic technology; histology; deep sea soundings and dredgings.

W. B. SCOTT [see 21].

Vertebr. and invert. palæontol.; adv. embryol.

W. M. RANKIN,

Ph.D.; Instr. in Biol. and Curator Zoöl. Mus. Anat. and embryol. mollusca.

C. F. W. McCLURE,

Instructor in Biol.

Comp. anat. of vertebr.; el. of embryology.

VANDERBILT.

JAMES M. SAFFORD,

M.D.; Ph.D., Yale, '44.

Outlines of Zoology and Palaeontology. 3, 16.

PAUL M. JONES,

M.S., '91; Dec., '92, Vanderbilt; Instructor Biology and Geology.

*Gen. Biology; Animal and Vegetable Morph. 2, 32.
 Comparative Anatomy. 3, 16.
 Histology. 3, 16.
 Vertebrate Embryology. 3, 32.

WESTERN RESERVE.

F. H. HERRICK,

Ph.D., Johns Hopkins, '88; Prof. of Biology.—Instructor in Biology, Adelbert, '88-'91; Prof. Biology, '91.—Crustacea.

*Elements of Zoology or Animal Morphology. 3, lab., S.-Ja.
 Animal Structure and Development. 3 exercises (5 hrs.), S.-Ja.
 *Vertebrate Embryology. 1, S.-Ja.
 *Vegetable Morphology. 1, F.-Ju.
 *Mammalian Anatomy. 3, S.-Ja.
 Animal Physiology. 3, F.-Ju.

WISCONSIN.

E. A. BIRGE,

Ph.D., Harvard; Professor of Zoology and Dean of the College of Letters and Science,

Invertebrate Zoology. 5, 36.
 Research work. 5, 36.

CHARLES R. BARNES,

Ph.D.; Professor of Botany.

Vegetable physiology. 5, 36.
 Bryology. 5, 36.

H. L. RUSSELL,

Ph.D., Johns Hopkins; Asst. Professor of Bacteriology.

Bacteriology. 5, 36.

YALE.

D. C. EATON,

A.M., Yale, 1864; Prof. Botany.—Ferns and Mosses.

Systematic Botany (Phænogams).

O.-Ju.

*Pteridology and Bryology. lab., 2, 32.

Botany (with W. A. Setchell).

A. E. VERRILL,

A.M., Yale, 1867; Prof. Zoology, Instr. Geol. and Curator Zool. coll.—Anatomy, Taxonomy, and distrib. animals, esp. Amer. invertebr.

Zoology (lab. pract. rec., and lect.).
 O.-Ju.

S. I. SMITH,

A.M., Yale, 1887; Prof. Comp. Anat.—Anatomy, Development, Taxonomy, and Distrib. of Crustacea.

*El. Anat. and Histol. 4, lab., 12, O.-D.

*Comp. Anat. and Gen. Biol. 6, lab., 20, Ja.-Ju.

Comp. Anat. and Gen. Biol. (adv.). lab. open 5 days per wk.

R. H. CHITTENDEN,

Ph.D., Yale, 1880; Prof. Phys. Chem.—Yale; Heidelberg; Instr. Phys. Chem., Yale, '76-82; Ed. *Studies fr. Lab. Physiol. Chem.*, Yale, '84-9; Assoc. Ed. *Four. of Physiol.*—Origin, action, and composition of var. chem. subs. in animal body, esp. action of digestive juices.

Physiol. Chem. and Physiology. Research.

*Physiology. 1, 32.

*Physiol. Chem. 4, 20, Ja.-Ju.

C. E. BEECHER,

Ph.D., Yale, 1889; Asst. Prof. Palaeontology.—Brachiopoda, Sponges, Corals, Crustacea.

Invertebrate Palaeontology. O.-Ju.

W. A. SETCHELL,

Ph.D., Harvard, 1891; Instr. Botany.—Struct. and Devel. Thumeya; Life; Hist. Saccorhiza.

Microscopic Anat. of Phænogamous Plants. 3, 1st half yr.

Element. Vegetable Physiology. 3, 2d half yr.

Morphology and Development of Cryptogamous Plants. 3, 32.

Mycology and Phycology. 3, 32.

21. GEOLOGY AND GEOGRAPHY.

[Including Palæontology (in part), Lithology, and Mineralogy. See also 19 and 20.]

CALIFORNIA.

J. LE CONTE,

M.D., N. Y.; B.S., Harvard; LL.D., Georgia; Prof. Geol. and Nat. Hist.

Lecture on special topics.

A. C. LAWSON,

Ph.D., Johns Hopkins; Assoc. Prof. Mineral.

Grad. work in Inorganic Geol.

S. B. CHRISTY,

Ph.B.; Prof. Min. and Met.

Lect., lab., and field work in mining, metallurgy, assaying and ore dressing, especially of precious metals.

CHICAGO.

T. C. CHAMBERLAIN,

Ph.D., U. of Mich., and U. of Wisc., 1882; LL.D., U. of Mich., 1887; Head Prof. of Geology, and Director of Walker Museum.—Asst., then Chief State Geologist, Wisc., since '73; U.S. Geol. Survey, since '82; Prof. Geol., Beloit Coll., '73-82; Lect., *ibid.*, '82-7; Prof. Geol., Columbian U., '85-7; Pres. U. of Wisc., '87-92; Ed. *Journal of Geology*.—Geology, esp. glacial.

Principles and working methods of geol. 5-10, 24, O.-Mr.

Special geol. (with R. D. Salisbury). 5-10, 6, O.-D., and Jul.-S.

Local field geol. (ditto).

Seminary. fort., 48.

Geologic Life Development. 4, 12, A.-Ju.

Professional Geology (with R. D. Salisbury). Jul.-S.

Independent field work (with R. D. Salisbury). Jul.-S.

R. D. SALISBURY,

A.M., Beloit, 1881; Prof. Geograph. Geol. and Dean in the Univ. Coll.—Heidelberg, '87-8; Beloit: Instr. Geol. and Biol., '83-4; Prof. Geol., '84-91; Asst. U. S. Geol. Survey, since '82; Prof. Gen. and Geogr. Geol., U. of Wisc., '91-2.

Geographic Geology. 5-10, 12, O.-D. Structural Geol. and Continental Evolution. 5-10, 12, Ja.-Mr.

Lab. Work in Geog. Geology (with H. B. Kümmel). 4, 6, N.-D.

Geographic Geol. 5-10, 6, Jul.-S. General Geology. 5-10, 12, Ja.-Mr. Field Geology. 10, 6, Au.-S.

J. P. IDDINGS,

Ph.B.; Assoc. Prof. Petrology.—Yale, '77-8; Columbia, '78-9; Heidelberg (Rosenbusch), '79-80; Asst. Geol., U. S. Geol. Sur., '80-8; Geologist since '88.—Petrography.

Crystallography. 4, 6, O.-N.

Physical Mineralogy. 4, 6, N.-D.

Petrography. 10-5, 36, O.-Ju.

Descriptive Mineralogy. 4, 12, Ja.-Mr.

Petrology. 4, 12, A.-Ju.

Petrology. 5-10, 6, A.-Ju.

R. A. F. PENROSE, JR.,

Ph.D., Harvard, 1886; Assoc. Prof. Economic Geol.—Harvard, '84-6; Asst. Geol., Geol. Survey of Texas, '88-9; of Arkansas, '89-92.—Manganese phosphate and iron-ore deposits; Texas tertiary.

Elements econ. geol. 5, 12, Ja.-Mr.

Ore deposits and allied formations. 5, 12, Ja.-Mr.

EDMUND C. QUEREAU,

Ph.D., Freiburg, 1893; Fellow, the University of Chicago, 1893; Asst. in Palæontologic Geology.

Palæontologic Geology. 5, 12 (or 10, 6), Ja.-Mr.

Special Palæontologic Geol. 5-10, 12, A.-Ju.

Palæontologic Geol. 5, 12 (or 10, 6), A.-Ju.

COLUMBIA.

J. F. KEMP,

E.M.; Prof. of Geology.—Columbia, '84-5; Leipzig, München, '85 6; Cornell: Instr. and Assoc. Prof. Geol. and Mineral., '86-91;

- Columbia, Adj. Prof. Geol., 91-2; Ed. *Sch. of Mines Quart.*—Econom. geol., petrography, mineral.
 Econom. geol. 3, 30.
 Petrography. 2, L 4, 2 mo. of 2d term.
 Petrog. 2, L 4, 30.
 Petrography (adv.). L 8, 30.
 Research in Petrog.
- A. J. MOSES,
 Ph.D.; Adj. Prof. Mineralogy.
 Systemat. mineral. 9, 60.
 Physical mineral. 9, 60.
 [With Mr. Luquer:]
 Descrip. and Math. crystallog.
- L. McI. LUQUER,
 G.E.; Tutor in Mineralogy.
 Optical props. minerals. 9, 30.
 [See also under A. J. Moses.]
- C. A. HOLLICK,
 Ph.B.; Tutor in Geology.—Columbia; Curator, N. Y. Acad. Sci.—Relations bet. geol., formations and distrib. of plants; fossil botany, esp. Cretaceous and Tertiary of East. U. S.
 Gen. geol. 2, O.—Ja.
 Palæobotany. 1, L 4, 60.
 Research in flora of cert. horizons.
 Research also with Prof. Kemp.
- S. VAN INGEN,
 Curator of Geological Collections.
 Invertebrate Palæontology. 2, L 4, 30.
- CORNELL.**
- Museum of Geology, Palæontol., and Mineral. comprises rich collection N.Y. State fossils (Jewett coll.) and other collections.*
- R. S. TARR,
 B.S.; Asst. Prof. Geology.—Harvard; Asst. Geol., Harvard; Asst. Geol., Texas Geol. Sur. and U. S. Geol. Sur.—Petrography, stratig. geol., phys. geol.
 Physical geography. 2, 32.
 Sem. in geol. 1, 32.
 Geological investigation in lab. and field. 2, 32
- A. C. GILL,
 Mineralogy. 3, 20.
 Petrography. 3, 20.
- G. D. HARRIS,
 Palæontology in lab. and museum. 3, 32.
 Conchology. 3, 32.
- HARVARD.**
- Geological conference meets weekly for presentation and discussion of papers. Advanced geological work, with original investigation, is conducted by all instructors, during the summer as well as during the rest of the year.*
- J. D. WHITNEY,
 LL.D.; Sturgis-Hooper Prof. of Geology.
 *Economical geol. 2, lab., 31.
 Mineral Veins and Metalliferous Deposits: their mode of occurrence, and theories of their origin. Lectures, reading, and theses.
 Geographical methods and results. 1, 31.
- N. S. SHALER,
 S.D.; Prof. of Geology.
 [With R. T. Jackson:]
 *Palæontology (el.). 3, lab., 31.
 *Histor. geol. 1, lab., 31.
 Palæontology. Research.
- W. M. DAVIS,
 S.B., M.E.; Prof. Physical Geography.—Asst., Argentine Nat. Obs., Cordova, Argentine Repub., '70-3; at Harvard since '76.—Triassic formation of Conn.; glacial geol.; physical geography, esp. nat. hist. of rivers; meteorology.
 Research in phys. geog. and meteorology.
 *Physical Geography of the United States. 3, 31, F.—Ju.
 [Physical Geography of Europe.] 3, 31, F.—Ju.
- J. E. WOLFF,
 Ph.D.; Asst. Prof. Petrography.
 *Petrography. 2, lab., 31.
 Petrograph. research.

Harvard — Continued.

J. B. WOODWORTH,
Asst. in Geology.

*Gen. critical geol. 2, lab., 31.
Glacial Geol. 31.

H. L. SMYTHE,

A.B., C.E.; Harvard, Instr. in Geological Surveying. — Topographer, U. S. Geol. Survey; Practising Civil and Mining Engineer. — Several articles on the Geology of the Lake Superior Regions.

Mining Geology. 3 D.-A.
Geological Surveying. 3 D.-A.
Pre-Cambrian Geology of North America. 3, 31.

JOHNS HOPKINS.

Geolog. conferences held weekly to read and discuss papers.

G. H. WILLIAMS,

Ph.D., Heidelberg, 1882; Prof. Inorganic Geology and Mineralogy. — Amherst, '79; Göttingen, '79-80; Heidelberg, '80-2; Assoc. Prof., Johns Hopkins, '83-92; Assoc. ed. *Jour. of Geol.* — Gen. mineral, crystallog., gen. petrography, geol. of Maryland.

Microscop. petrography.
Mineralogy.
Lab. work in inorganic geology.

W. B. CLARK,

Ph.D., München, 1887; Assoc. Prof. Organic Geol. — München, '84-7; Dir. Maryland State Weather service; Asst. U. S. Geol. Sur. — Stratigraphical geol. and palaeontol., esp. Eocene of U. S.; mesozoic echi-
noderms of U. S.; Cretac. and tertiary geol. of N. J. and Md.; Phys. features of Md.

Palaeontology.
Historical geology.
Lab. work in organic geology.
Lectures on general geology by Prof. Williams and Dr. Clark.

LELAND STANFORD, JR.

JOHN C. BRANNER,

Ph.D., Indiana Univ., 1885; Prof. of Geology. — Prof. Geology, Indiana Univ., 1885-91; State Geologist of Arkansas, 1887-92.

*General and Economic. Geol. 3, 32.
*Topographic Geol. 5, 32.
Adv. investigations.

JAMES P. SMITH,

Ph.D., Göttingen, 1892; Assoc. Prof. Mineralogy and Palaeontology. — Asst. Geologist, Arkansas Geol. Survey, 1887-90.

*Adv. Mineral. and Petrography. 5, 32.
**Adv. Palaeontology. 2 to 5, 32.

MICHIGAN.

I. C. RUSSELL,

M.S., C.E.; Prof. of Geology. — Columbia Sch. of Mines, '72-4; Asst., U. S. Transit of Venus exp., '74-5; Asst. Prof. Geol., Columbia, '75-7; Asst. Geol., U. S. Surv., 100th Mer., '78; Asst. Geol. and Geol., U. S. Geol. Surv., '80-92; Assoc. ed. *Jour. of Geol.* — Pleistocene lakes of Great Basin, existing glaciers U. S.; Geol. of Oregon; Wash., and Alaska.

Physical and Glacial Geol. 2, 17, O.-F.
Palaeont. investig. 2-3, 17, F.-Ju.

MINNESOTA.

CHRISTOPHER W. HALL,

Middlebury College, '71; Univ. of Leipsic, '75-77; Prof. of Geology and Mineralogy since 1878. — Has published many articles in Geological and Mineralogical magazines; founder of the Minnesota Academy of Natural Sciences.

The Granitic Rocks of Central Minnesota.
The Pre-Cambrian Eruptives of Northeastern Minnesota.
Basic Intrusives and their Contact Phenomena.
The Lower Paleozoic of Southeastern Minnesota. Special field to be selected on consultation.
Original Problems on particular groups of minerals; the group to be selected on consultation.
Individuals directed in research work throughout the year.

PENNSYLVANIA.

A. P. BROWN,

Ph.D., U. of Penn., '93; Instr. in Mining and Metallurgy. — U. of Penn. — Articles on Geology and Mineralogy.

Geology (as in catalogue). 2, 30.
Dynamical Geology and Physiography. 1, 30.

Chemical Geology and Metamorphism. 1, 15.
 Geology Practicum. 3, 30.
 Mathematical and Physical Crystallography. 1, 15.
 Systematic Mineralogy and classification. 1, 15.
 Synthetic Mineralogy, Pseudomorphs and Paragenesis. 1, 30.
 Mineralogy Practicum. 4, 30.

PRINCETON.

WILLIAM LIBBY, JR.,

Ph.D., Princeton, 1879; Prof. Physical Geography and of Normal Histology, and Dir. E. M. Mus. Geol. and Archæol.—Princeton, '88-79; Berlin, '79-80; Paris, '80; Asst. in Scientific Inquiry, U. S. Fish Com.—4th ed. Smithsonian meteorol. and physical tables; physical investig. of Gulf Stream.

Relat. of phys. geog. to hist. of mankind. 1, 16, F.-Ju.

W. B. SCOTT,

Ph.D., Heidelberg, 1880; Blair Prof. Geol.—Princeton, '77-78; London, Cambridge, '78-79; Heidelberg, '80.—Palæontol. and embryol. of vertebr.; histor. geol., theories of evolution.

Physical geology. 2, 32.

VANDERBILT.

JAMES M. SAFFORD,

M.D.; Ph.D., Yale, 1844.

*Economic Geology. 3, 32.
 Ore Deposits. 3, 32.

PAUL M. JONES,

M.S., '91; D.Sc., '92, Vanderbilt; Instructor Geology and Biology.

Advanced Mineralogy. 3, 16.
 Petrography. 3, 16.

WESTERN RESERVE.

H. P. CUSHING,

M.S., Cornell.—Assoc. Prof. of Geology, Cornell, 1882-83; Columbia School Mines, 1883-84; Instructor Geology, Chemistry, Physics, State Normal School, Mankato, Minn., 1885-91; Europe, '91-92; Instructor in Geol. and Chemistry, Coll. for Women, W. R. U., '92.—Petrography.

Descriptive Mineralogy and Crystallography. 3 exercises, S.-Ja.

*Elements Qualitative Analysis. 3, lab., S.-Ja.

*Determinative Mineralogy. 3, lab., F.-Ju.

Petrography. Time to be determined.
 Stratigraphical and Dynamical Geology. Time to be determined.

WISCONSIN.

CHARLES R. VAN HISE,

Ph.D.; Prof. of Geology; non-resident Prof. of Pre-Cambrian Geology, Univ. of Chicago; Geologist in charge of Lake Superior Division, U. S. Geol. Survey.

Principles and Methods of Stratigraphy. 5, 36.

WILLIAM H. HOBBS,

Ph.D., Johns Hopkins; Asst. Prof. of Mineralogy and Petrology; Asst. Geologist, U. S. Geol. Survey.

Petrology. 5, 36.

YALE.

G. J. BRUSH,

A.M., Yale, 1857; LL.D., Harvard, '86; Prof. Mineralogy and Director Sheffield Sci. School.—Minerals.

[With S. L. Penfield and L. V. Pirsson:]

Mineralogy, lab. and lect.

Lithology, microscop. petrography.

H. S. WILLIAMS,

Ph.D., Yale, 1871; Prof. Geology.—Formerly Prof. Geol. and Palæontol., Cornell; U. S. Geol. Survey.—Palæontol., Stratigraphy, and Correlat. of Dev. and Carb., etc., and Gen. Princip. Palæontol. and Histor. Geol.

Hist. Geol. and Palæontol.

*Geol. (gen. course). 2, 32.

*Geol. Hist. of Organisms. 3, 32.

*Geol. (adv. course).

W. H. BREWER [see also 12],

Ph.D., Washington and Jefferson, 1880; Norton Prof. Agriculture.—Formerly Prof. Nat. Sci. in Wash. Coll.—Agricult. Topics, esp. Breeding Botany and Geol. California; Sanitation; Gen. Biol.

*Phys. Geog. 2, 32

Yale — Continued.

E. S. DANA,

Ph.D., Yale, 1876; Prof. Physics. — Ed.
Amer. Journal Sci. — Mineralogy.*Mineralogy and Crystallography. 2,
32.

*Descriptive Mineralogy. 1, 32.

S. L. PENFIELD,

Ph.B., Yale, 1877; Asst. Prof. Mineralogy.
— Mineralogy and Crystallography. [See
under G. J. Brush.]

L. V. PIRSSON,

Ph.B., Yale, 1882; Instr. Lithology. — Min-
eralogy and Crystallography. [See under
G. J. Brush.]

APPENDIX.

CORNELL.

[See note, page 19.]

2. Indo-Iranian Languages and Literatures.

B. I. WHEELER [see 3].

Interpretation of Rig Veda. 2, 12, O.-D.

G. P. BRISTOL [see 3].

Sanskrit (el.). 2, 32.

3. Classic Languages and Literatures.

2 fellowships, \$500 each.

BENJAMIN I. WHEELER [see also 2 and 7],

Ph.D., Heidelberg, 1884; Prof. of Greek and Comp. Philology.—Leipzig, '81-2; Heidelberg, '82-4; Jena, 84; Berlin, '84-5; Instr., Brown, '79-81; Instr., Harvard, '85-6; Joint Ed. Classic Stud. (Cornell).—Hist. of Greek Noun Accent; Influence of Analogy in Lang.; Gen. Principles of Lang. Hist.

Private and Public Antiquities of Greeks. 2, 32.

Sem. Study of Inscriptions. 2, 32.

CHARLES E. BENNETT,

A.B.; Prof. of Latin Lang. and Lit.—Harvard, '81-2; Leipzig, '82-3; Berlin, '83-4; Heidelberg, '84; Assoc. Prof. Class. Phil., Nebraska Univ., '89; Prof. of Latin, Wisconsin Univ., '89-91; Prof. Class. Phil., Brown, '91-2.—Greek dialects and gram.; Ed. Xenophon's Helleniad.

Teachers' Training Course. 1, 32.

Syntax of the Latin cases (sem.) 2, 32.

The Republican Literature. 3, 32.

ALFRED EMERSON [see 14].

Modern Greek. 2, 12, O.-D.

GEORGE P. BRISTOL [see 2],

A.M.; Assoc. Prof. of Greek.—Johns Hopkins, Leipzig, Heidelberg.—Lysias, Early Greek Hist.

Attic Orators. 2, 32.

L. L. FORMAN,

A.B., Ph.D.; Instr. in Greek.

*Aristophanes read; lects. on Greek comedy. 2, 32.

*Adv. Greek Compos. 1, 32.

H. C. ELMER,

A.B., Ph.D., Johns Hopkins, 1888.

Adv. Lat. Compos. 1, 32.

W. A. HAMMOND [see 8].

Aristotle's Nichom. Ethics; Plato's Philebus. 2, 32.

Aristotle's Metaphysics. 1, 32.

4. English Language and Literature.

1 prize of \$60.

HIRAM CORSON,

A.M., LL.D.; Prof. Eng. Lit.

English Literature. 5, 32.

19th cent. prose, excl. novels (sem.).

19th cent. novelists (sem.).

17th and 18th cent. prose, excl. nov. (sem.).

18th cent. novelists (sem.).

Cornell — Continued.

J. M. HART,

A.M., J.U.D., Göttingen, 1864; Prof. Rhetoric and English Philology.—Princeton, '63; Göttingen, '64; Asst. Prof. in Mod. Lang., Cornell, '68-72; Prof. Mod. Lang. and Engl. Lit., Cincinnati, '76-90.—German Universities; German Classics; Anglo-Sax. Lit.; Germanic Philology.

Icelandic. 2, 20, Ja.—My.
Gothic and Anglo-Saxon (cl.). 3, 32.
Philol. sem.: Early and mid. Engl.
2-4, 32.

*Sen. Rhetoric: Sem. Invention and Style. 3, 32.

O. F. EMERSON,

Ph.D., 1891; Asst. Prof. Rhetoric and Engl. Philology.—Cornell, '88-92; Principal, Acad. of Iowa Coll., '85-8; Instr., Cornell, '89-92.—Shakespeare's Anthony and Cleopatra, Ithaca dialect.

Middle Engl. philol. 3, 32.

*Hist. of Eng. lang. 2, 32.

*Phonetics, esp. American English.
1, 32.

5. Germanic Languages and Literatures.

Department will direct the work of graduates in their chosen subjects other than those announced.

H. S. WHITE,

A.B., 1873; Prof. German Lang. and Lit., and Dean.—Berlin, Leipzig.—German Lit. (Lessing, Heine) and folk songs; text-books of German Lang.; Goethe.

Life and work of Walther v. der Vogelweide (sem.). 2, 32.
Schiller's lyrics. 3, 24, O.—Mr.
Deutsche Volkslieder. 3, 8, A.—My.

W. T. HEWETT,

Ph.D., Cornell, 1879; Prof. German Lang. and Lit.—Athens, Heidelberg, '69-70; Leipzig, Leyden, '77-8; Berlin, '87-8; Mem. Frisian Soc. for Hist., Archæol. and Lit.; Mem. extraord. Soc. Frisian Lang. and Lit., etc.—Frisian Lang. and Lit.; German (esp. Goethe) Lit.: Hist. of Universities; Dutch Hist.

Goethe's Faust. 2, 24, O.—Mr.

Mid. High German. 2, 32.

Umland and Swabian Sch. 2, 8, A.—My.

H. J. JONES,

Ph.D., Göttingen.

Old High German. 2, 20, Ja.—My.

J. M. HART [see 4].

Germanic Philology.

6. Romance Languages and Literatures.

Special collect. of Rhamo-Romanic lit. and lang., over 1,000 vols.

T. F. CRANE,

Ph.D., Princeton, 1874; Prof. Romance Langs. and Lits.—Princeton.—French: Lit. of 17th and 19th cents; Italian: Pop. lit., medieval lit.

French society in 17th cent., esp. letter writing. 2, 32.

French criticism in 17th cent. (sem.).
2, 32.

Orig. and devel. of French lang. and lit. to 17th cent. 1, 32.

Select. from Dante, Petrarch, Boccaccio; Early Ital. lit. 2, 32.

MR. OTTO.

Romance philol., phonetics, etc.
2, 32.

MR. VERGAUVEN.

Readings from French Romantic School. 2, 32.

7. Comparative Language and Literature.

B. I. WHEELER [see 2 and also 3].

Introd. to Science of Language.
1, 32.

Gothic gram.; orig. of Germanic lang. 2, 20.

Philol. semin. 2, 32.

8. Philosophy and Ethics.

The courses here given and those inq belong to the Susan Linn Sage School of Philosophy, richly endowed with \$200,000 besides a professorship, by H. W. Sage, of Ithaca. Included in the school are 8 officers of

instruction. There is a well-equipped psychological laboratory. The department issues "The Philosophical Review." Kant library of 100 vols. Three fellowships worth \$400, and six scholarships worth \$200, are open to advanced students. [See also 9.]

J. G. SCHURMAN,

D.Sc.; President of the Univ., and Prof. Mental and Moral Philosophy.

Ethics. 2, 32.

Ethical sem. 1, 32.

Crit. Phil. of Kant (with Prof. Creighton). 2, 32.

C. M. TYLER,

A.M., D.D.; Prof. Hist. and Philos. Religion and Christian Ethics. — Union Theol. Sem.; Pastor var. churches. — var. Philos. articles.

Hist. of religions. 3, 32.

Christian ethics. 1, 32.

Philosophy of religion (sem.). 2, 32.

J. E. CREIGHTON,

Ph.D.; Assoc. Prof. Mod. Philos.

*Hist. modern philosophy. 3, 32.

Post-Kantian idealism. 2, 32.

Metaphysical sem. (with Mr. Albee).

W. A. HAMMOND,

Ph.D., Leipzig, 1891; Asst. Prof. Ancient and Mediaeval Philosophy. — Leipzig, '88-91; Inst. in Ancient Philos., Cornell, '91-2. — Notion of Virtue in Plato's Dialogues; Anc. and Mediaeval Philos.

*Hist. Greek and mediaeval philos. 2, 32.

*Dialogues of Plato and Metaphysics of Aristotle. 2, 32.

Aristotle: Nichom. Eth.; Plato: Philebus. 1, 32.

Metaphysics of Aristotle (Greek). 1, 32.

F. C. A. SCHILLER,

M.A., Oxford.

Spinoza's Ethics. 1, 12, O.-D.

Evolutionism with spec. ref. to Spencer. 3, 32.

E. ALBEE,

A.B., Ph.D., Cornell, 1894; Instr. in Philos.

Hist. of Engl. Utilitarianism. 2, 32.
Leibnitz, Hume, Kant. 3, 32.

9. Psychology and Pedagogics.

[Cf. introd. in 8.]

Lib. of witchcraft and diabolism, 1,500 vols. and pam., 50 MSS.

S. G. WILLIAMS,

Ph.D.; Prof. of Institutes and Hist. of Education. — Principal of High Schools; Prof. Geology, Cornell. — Economic Geol.; Hist. Mod. Educ., etc.

Pedagogy (sem.). 1, 32.

*Inst. of education. 3, 32.

Hist. of education. 2, 32.

E. B. TITCHENER,

Ph.D., Leipzig, 1892; Asst. Prof. Psychol. and Dir. Psychol. Lab. — Oxford, '89-90; Leipzig, '90-2; Extension Lect. in Biol., Oxford, '92. — Leipzig School of Exper. Psychol., Chronometry, Psychological optics, etc.

*Adv. psychology. 3, 32.

Psychol. optics, or Acoustics. 1, 32.

Adv. Probs. in exp. psychol. 1, 32.

Psychol. sem. Weekly.

Experimental psychol. 2, 32.

Mental pathology. 1, 32.

10. History and Politics.

President White Hist. Lib. of about 20,000 bound volumes and 3,000 pamphlets, esp. rich in works on period of Reformation, English and French Revolutions, Am. Civil War, and Hist. of Superstition; also Sparks Lib. of over 5,000 vols. and 4,000 pam. on Hist. of Am.; and May collection of 1,000 vols. and 2,000 pam. on Slavery. 2 fellowships of \$500 and \$400.

M. C. TYLER,

A.B., L.H.D., Columbia; Prof. American Hist. — Prof. English Lit., U. of Mich., 1867-81. — Hist. Am. Lit.; Life of Patrick Henry.

*Am. constitut. hist. (sem.). 2, 32.

Am. hist. seminary. 2, 32.

*Am. hist. from Revolution to present. 3, 32.

Cornell — Continued.**G. L. BURR,**

A.B.; Prof. Anc. and Mediæval Hist.—
 Cornell, '81-4; Leipzig, '84-5; Paris, '85-6;
 Zürich, '86; Cornell: Instr. in Mod. Hist.,
 '81-4; Instr. Anglo-Saxon, '86-7; Instr. in
 Mediæv. and Mod. Hist., '88-9; Asst. Prof.
 Hist., '89-91; Assoc. Prof., '91-2.—Refor-
 mation, relig. persecution, superstition.

Palæography and diplomatics; study
 of MSS. 2, 12, Ja.—Mr.

Excommunication in Mediæval Eng-
 land (sem.). 2, 8, A.—My.

Reading of med. chroniclers, Nithard.
 2, 12, O.—D.

Beginnings of History. Oriental
 hist. 1, 32.

J. W. JENKS,

Ph.D.; Prof. Political Economy and Civil
 and Social Institutions.

Polit. institut., esp. in U. S. 3, 32.

Hist. polit. ideas. 1, 32.

Seminary in politics. 2, 32.

[All other departments of Cornell will be found in their proper places.]

